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Investigating School Mathematics

Extending the Ideas

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ISBN 0-201-09547-5

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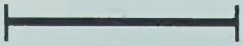
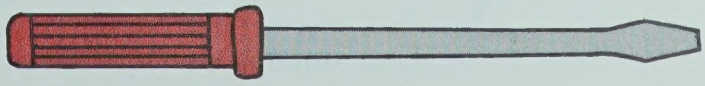
Finding Length

Complete the table.

	IF this is one unit	THEN the length of this object is	
1.			units
2.			units
3.			units
4.			units
5.			units
6.			units
7.			units
8.			units
9.			units
10.			units

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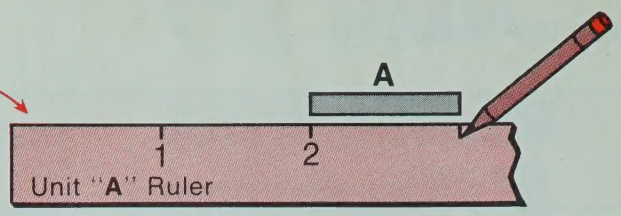
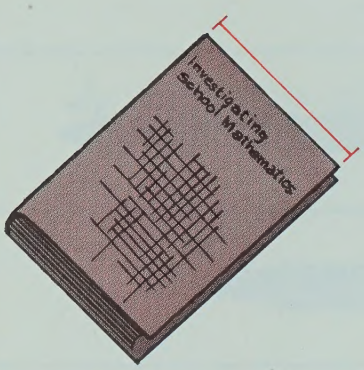
Making a Ruler

Make a ruler.
Use one of the units—**A**, **B**, or **C**, shown below.



Use your ruler to measure some of the objects suggested in the pictures.

1.

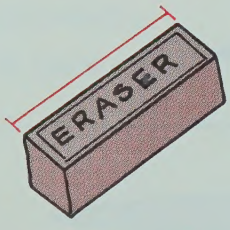


_____ units

2.

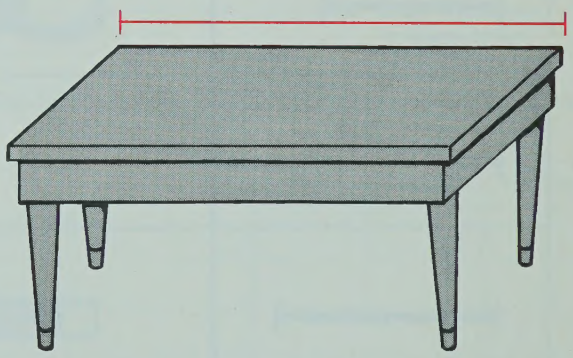
_____ units

3.



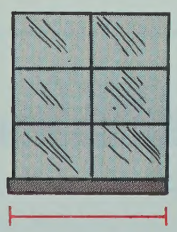
_____ units

4.



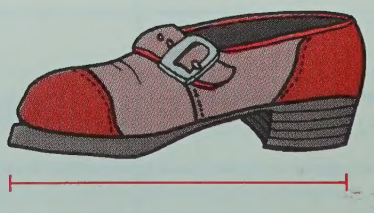
_____ units

5.



_____ units

6.

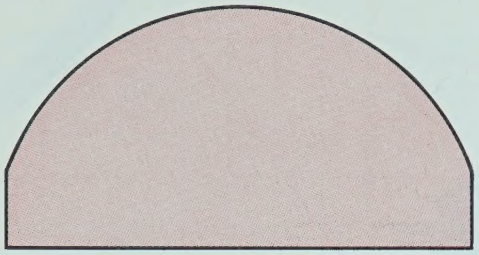


_____ units

Finding the Distance Around

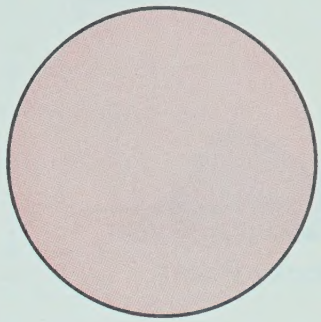
1. Can you find a way to measure the distance around these figures? Use centimeter units.

A



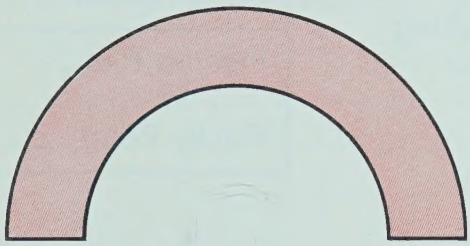
About _____ cm

B



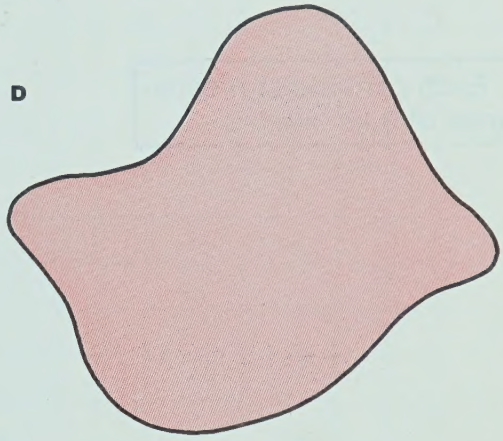
About _____ cm

C



About _____ cm

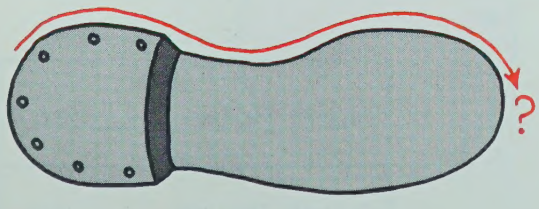
D



About _____ cm

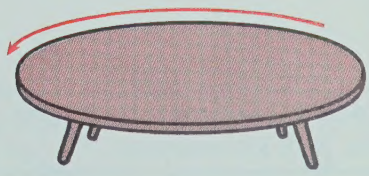
2. Can you find the distance around some objects such as the ones suggested by these pictures?

A



A Shoe: about _____ cm

B



A Round Object: about _____ cm

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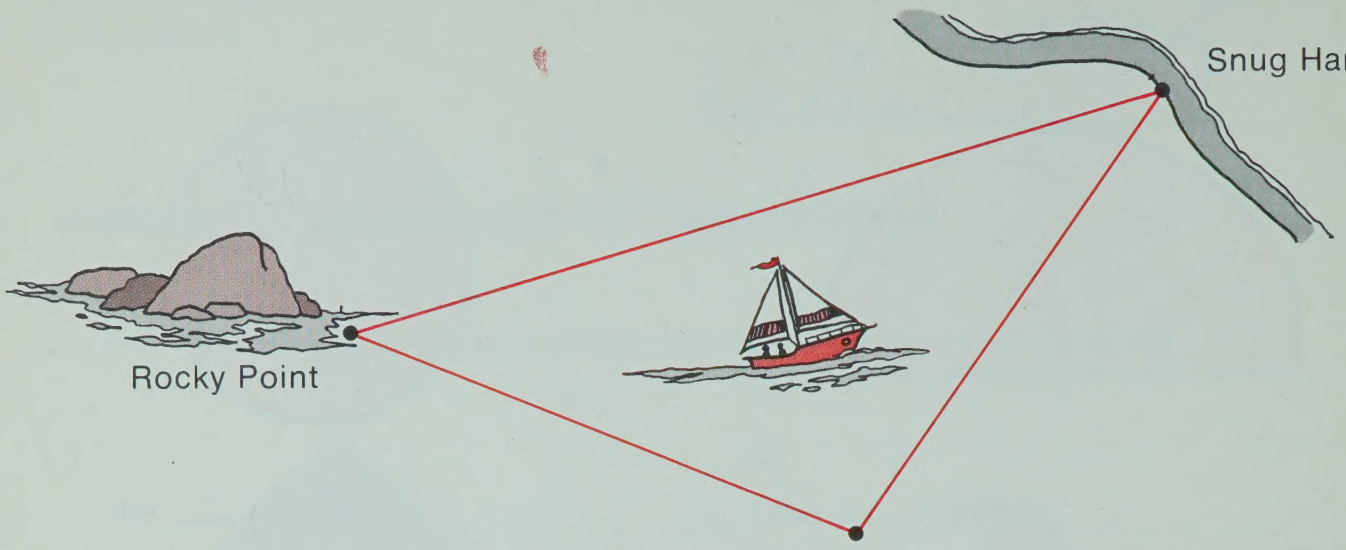
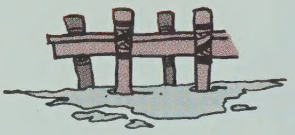
Distance on a Map

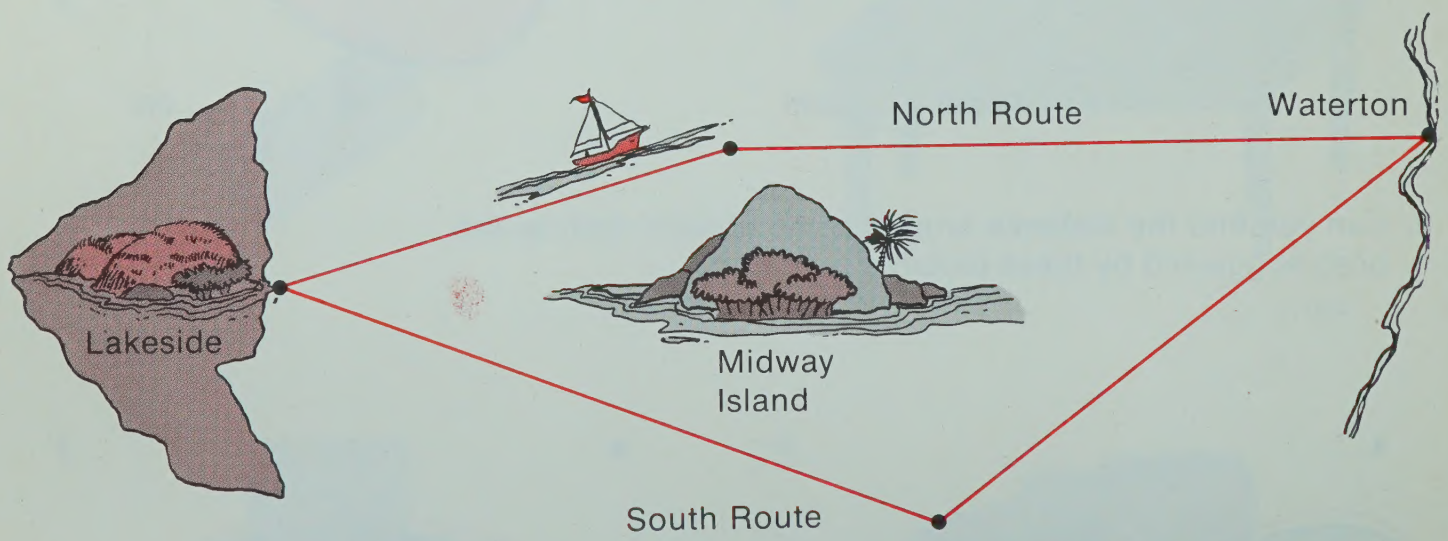
Use the map and scale to give the distances in kilometers.





Scale: Each centimeter means a distance of 3 kilometers.

Rocky Point to Snug Harbor _____ km
Fishing Pier to Rocky Point _____ km



Scale: Each 2 centimeters means a distance of 5 kilometers.

North Route _____ km
South Route _____ km

Area

1. Can you draw regions that have the given areas? Use the graph paper unit.

Square

A

Area: 36 square units

Rectangle

B

Area: 30 square units

Triangle

C

Area: 18 square units

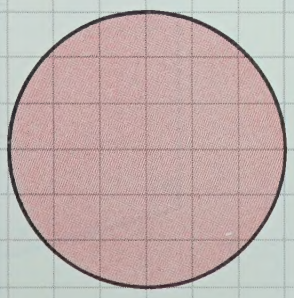
Triangle

D

Area: 24 square units

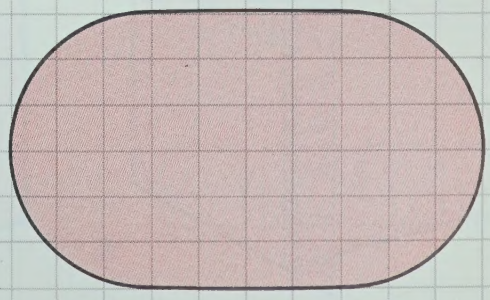
2. Estimate the area of each region.

A



_____ square units

B



_____ square units

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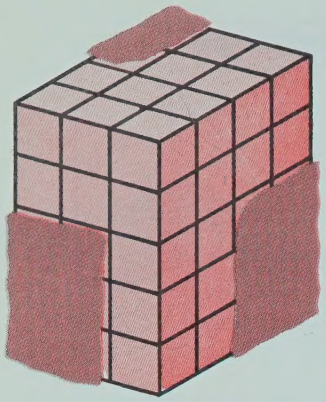
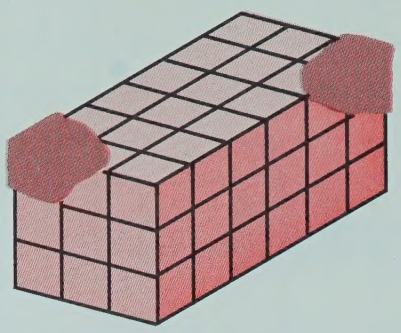
Volume

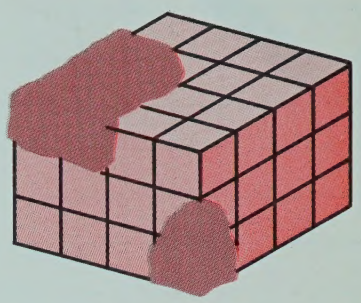
Find the volume of each figure.

1. 

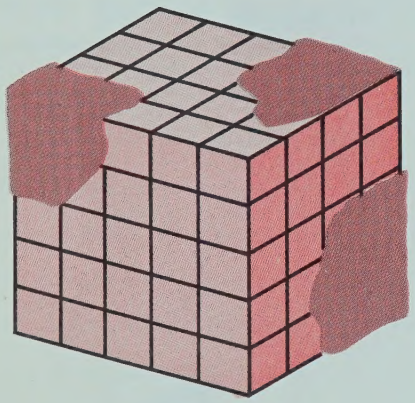
_____ cubic units

2. 

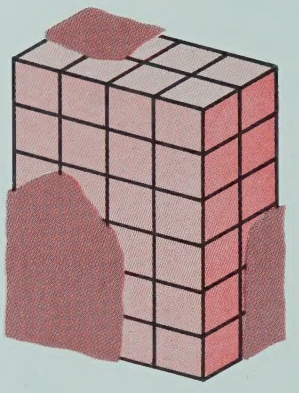
_____ cubic units

3. 

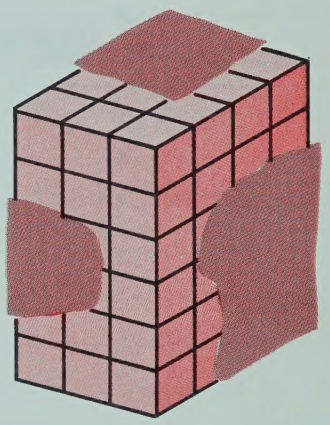
_____ cubic units

4. 

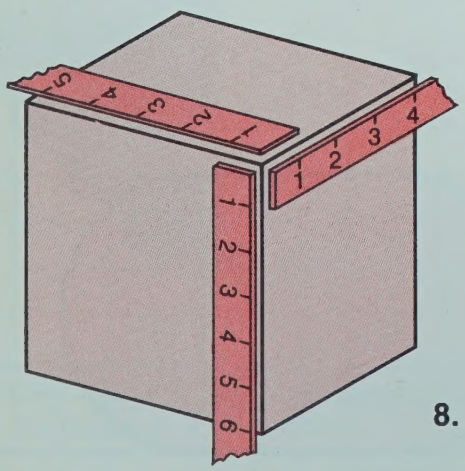
_____ cubic units

5. 

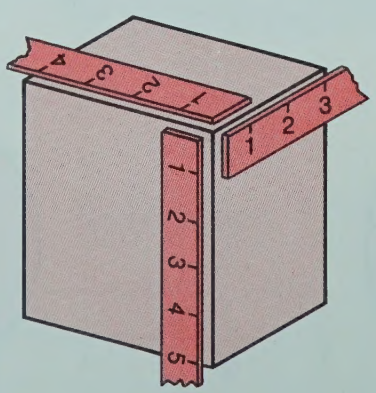
_____ cubic units

6. 

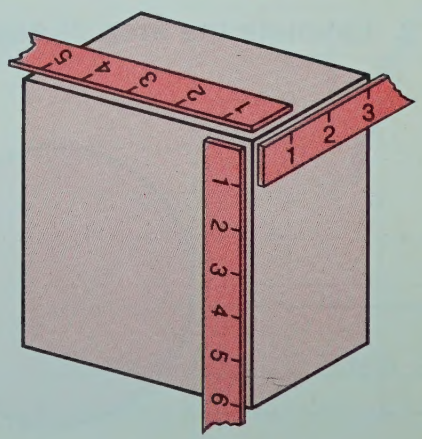
_____ cubic units

7. 

_____ cubic units

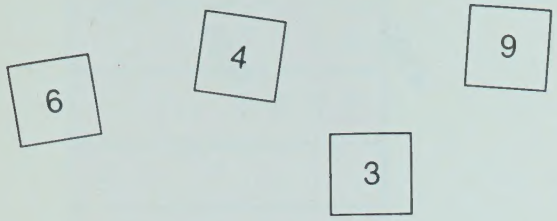
8. 

_____ cubic units

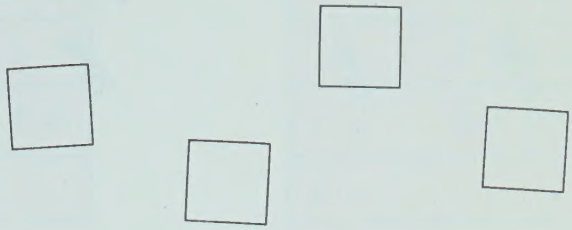
9. 

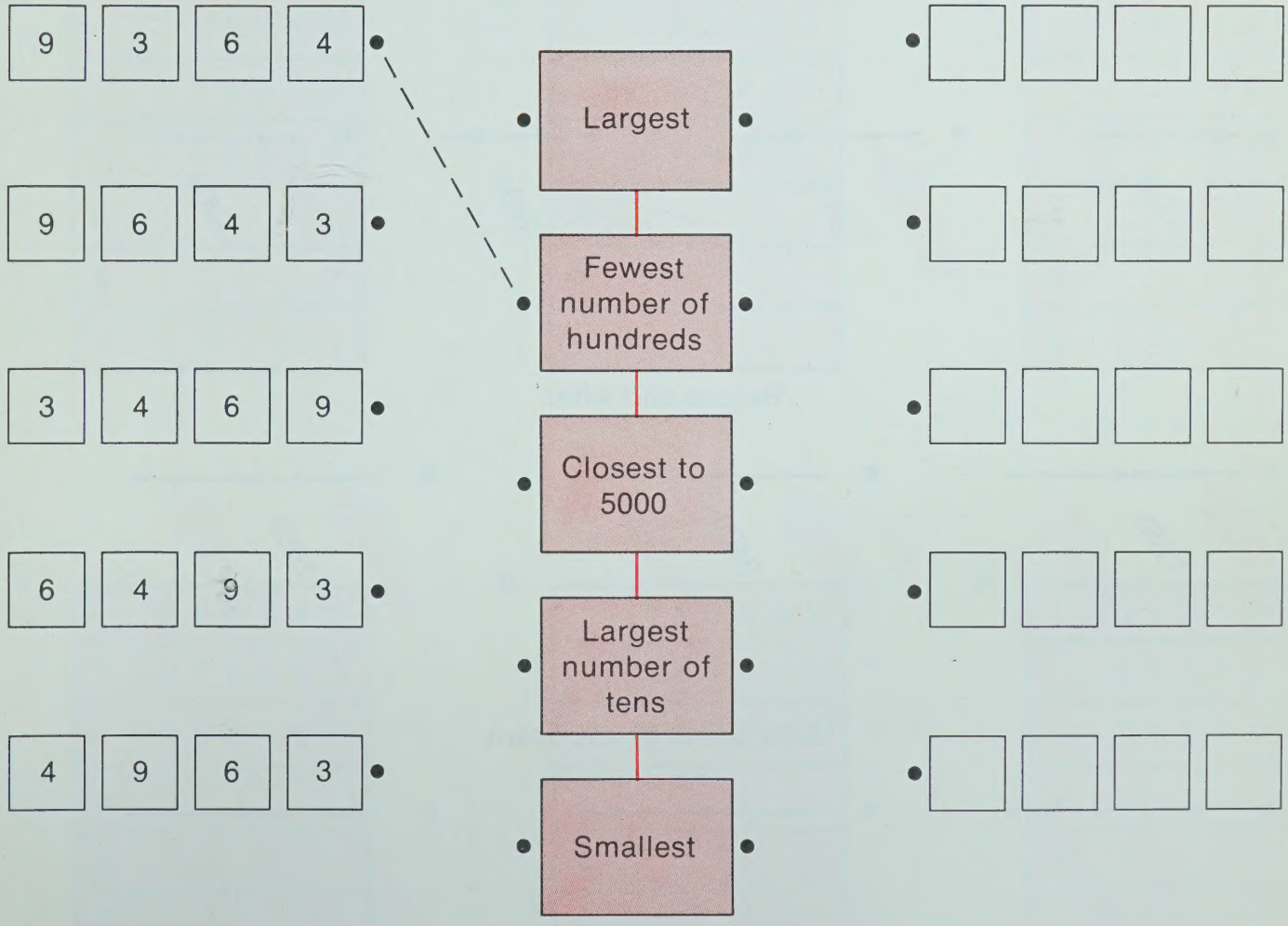
_____ cubic units

The numbers below were built with the digits 6, 3, 4, 9.
Complete the matching.



Choose your own set of digits. Use your digits to build numbers to match with the colored boxes.





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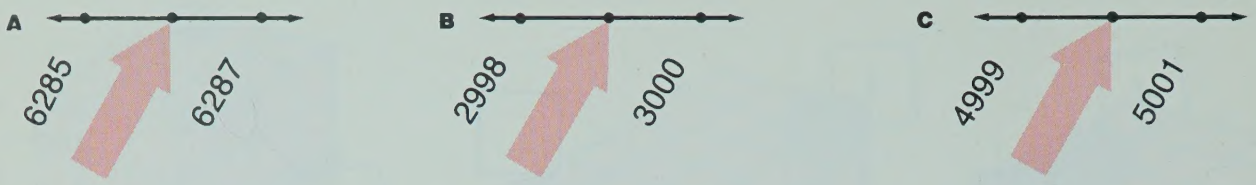
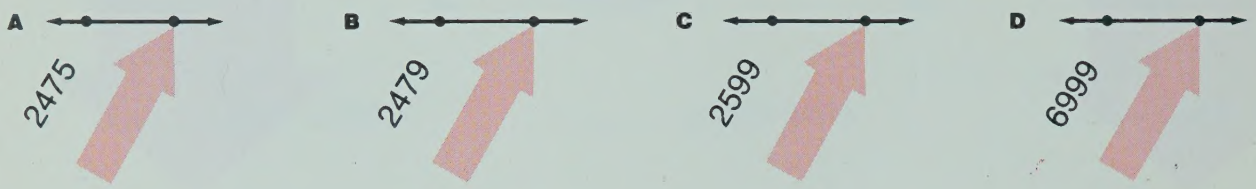
Order of Numbers

Give the missing numbers.

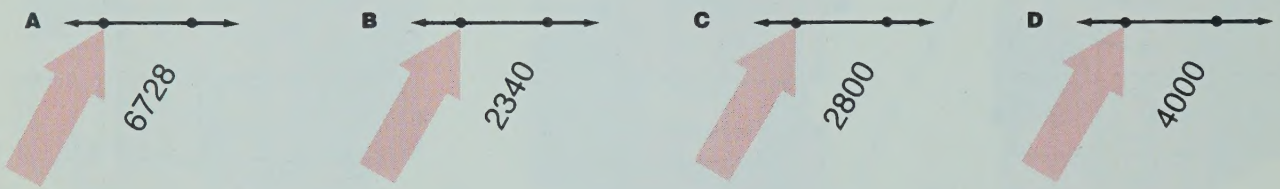
1. Between



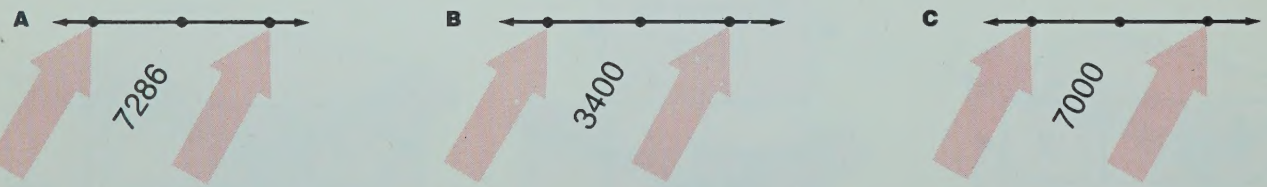
2. After



3. Before



4. Before and After



5. Make some of your own

Sequences with Large Numbers

Give the next three numbers in each table.

1.

3 2 6 5
3 2 6 6
3 2 6 7
A
B
C

2.

4 5 9 6
4 5 9 7
4 5 9 8
A
B
C

3.

2 9 9 7
2 9 9 8
2 9 9 9
A
B
C

4.

1 6,4 5 2
1 6,4 5 4
1 6,4 5 6
A
B
C

5.

3 5,6 2 7
3 5,7 2 7
3 5,8 2 7
A
B
C

6.

2 5,3 8 4
3 0,3 8 4
3 5,3 8 4
A
B
C

7.

2 6 8,4 8 3
2 7 8,4 8 3
2 8 8,4 8 3
A
B
C

8.

7 4 8,4 8 9
7 4 8,6 8 9
7 4 8,8 8 9
A
B
C

9.

6 0 3,1 2 3
6 5 3,1 2 3
7 0 3,1 2 3
A
B
C

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Large Numbers

1. With the numerals on these cards, you can "write" six different large numbers. How many of them can you write?

302 475 961

A 302, 475, 961 B _____ C _____

D _____ E _____ F _____

2. A Which of the six numbers above is largest? _____

B Which is smallest? _____

3. Give the correct sign > or < for each ▢.

A 32,645,794 ▢ 33,000,000

B 500,000,000 ▢ 498,634,259

C 6,137,000 ▢ 5,879,000

D 364,287,512 ▢ 400,000,000

E 98,463,217 ▢ 642,123,012

K 1,000,000,000 ▢ 99,999,999

L 212,341,003 ▢ 78,867,948

M 367,482,531 ▢ 367,482,529

N 675,835,609 ▢ 675,834,609

O 407,826,742 ▢ 407,816,742

4. Make up six 9-digit numbers of your own.

A _____ B _____ C _____

D _____ E _____ F _____

5. Arrange your numbers above in order from smallest to largest.

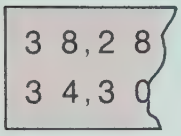
A _____ smallest B _____ C _____

D _____ E _____ F _____ largest

Which Number is Larger?

Part of each slip of paper is missing. Each slip had two 8-digit numbers on it. When you can decide which of the two numbers is greater, ring it. When you can't decide, ring both numbers.

1.



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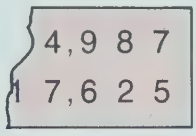

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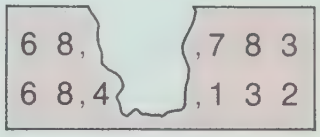

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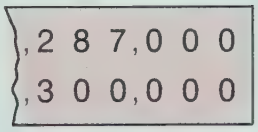

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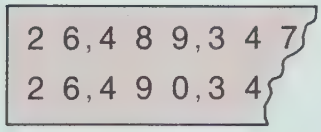

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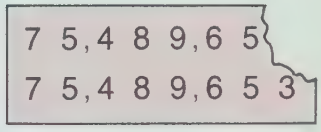

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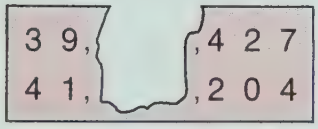

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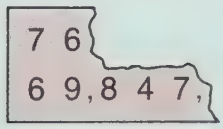

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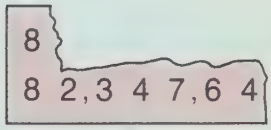
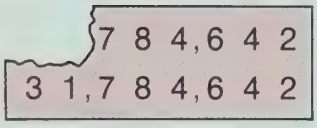


10.



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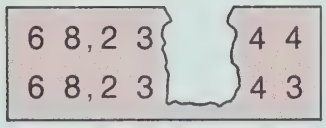

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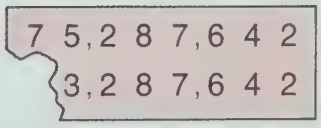

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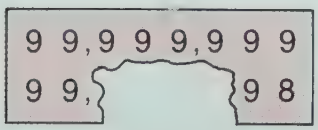

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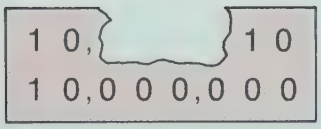

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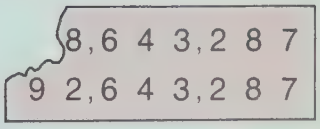

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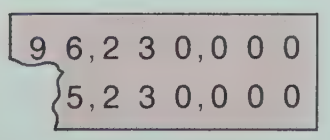

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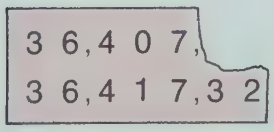

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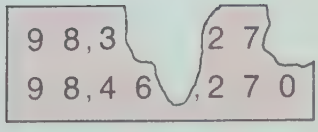

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Using Powers of 10 in Place Value

1. Study the chart. Then give the correct sign $>$ or $<$ for each ◯.

$10^2 = 100$	$10^6 = 1{,}000{,}000$
$10^3 = 1000$	$10^7 = 10{,}000{,}000$
$10^4 = 10{,}000$	$10^8 = 100{,}000{,}000$
$10^5 = 100{,}000$	

A $98{,}765 \bigcirc 10^5$

B $98{,}765 \bigcirc 10^6$

C $10^8 \bigcirc 34{,}178{,}654$

D $10^7 \bigcirc 34{,}178{,}654$

E $10^6 \bigcirc 9{,}999{,}999$

F $10^6 \bigcirc 999{,}999$

G $10^8 \bigcirc 111{,}111{,}111$

H $100{,}000{,}001 \bigcirc 10^8$

I $999{,}999{,}999 \bigcirc 10^8$

J $99{,}999{,}999 \bigcirc 10^8$

K $10^7 \bigcirc 88{,}888{,}888$

L $10^6 \bigcirc 8{,}888{,}888$

2. A What number is one more than 10^5? _____

B What number is 675 more than 10^3? _____

C What number is one less than 10^7? _____

D What number is 7463 more than 10^6? _____

E What number is one less than 10^8? _____

3. A Write the number for 10^9. _____

B Write the number that is one less than 10^9. _____

4. Find the sums.
EXAMPLE: $10^4 + 10^2 = 10{,}100$

A $10^3 + 10^2$ _____

B $10^4 + 10^3$ _____

C $10^5 + 10^3$ _____

D $10^4 + 10^3 + 10^2$ _____

E $10^5 + 10^4 + 10^3 + 10^2$ _____

F $10^8 + 10^6 + 10^4 + 10^2$ _____

G $10^2 - 1$ _____

H $10^3 - 1$ _____

I $10^6 - 1$ _____

Give the missing numbers or function rule.

1.

Function Rule: Double and Add 4

	Input	Output
	5	14
	3	10
	7	18
A	6	
B	8	
C	9	

2.

Function Rule: Double and Subt 3

	Input	Output
	2	1
	7	11
	6	9
A	5	
B	4	
C	9	

3.

Function Rule: A

	Input	Output
	7	4
	13	10
	6	3
	3	0
B	8	
C	5	

4.

Function Rule: A

	Input	Output
	6	12
	8	16
	7	14
B	9	
C	5	
D	4	

5.

Function Rule: A

	Input	Output
	6	13
	5	11
	7	15
B	9	
C	3	
D	4	

6.

Function Rule: A

	Input	Output
	2	0
	4	4
	7	10
B	6	
C	8	
D	9	

7.

Function Rule: A

	Input	Output
	6	18
	2	6
	5	15
B	4	
C	3	
D	0	

8.

Function Rule

	Input	Output
	7	1
	4	0
	5	1
	8	0
	9	1
	2	0

Give the missing number pair for each row.

9.

Sum + Difference =

	11	6	+	5	1
	12	9	+	3	6
A	13		+		1
B	17		+		1
C	15		+		1
D	14		+		2
E	13		+		3

10.

Sum + Difference =

A	12		+		0
B	18		+		0
C	16		+		0
D	14		+		0
E	10		+		8
F	9		+		7
G	8		+		6

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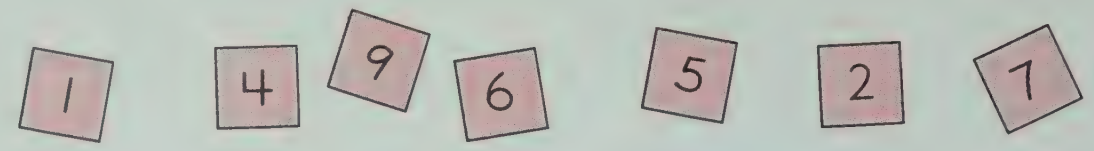
Adding and Checking



Can you find 3 numbers on the cards whose sum is this number?

Your first equation is correct if the sum of the numbers on the other cards is this number. Check to see.

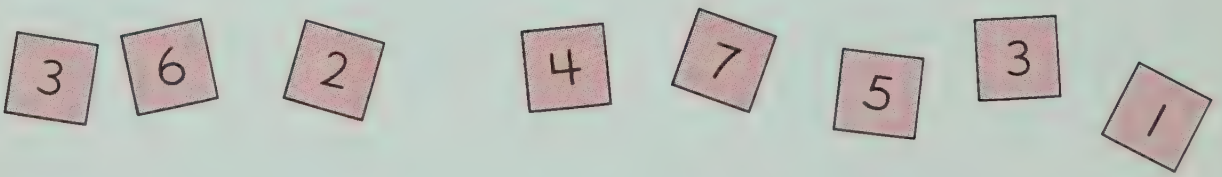
1. **A** ___ + ___ + ___ = 15 **B** ___ + ___ + ___ + ___ = 19

Try it again with these sums.

2. **A** ___ + ___ + ___ = 17 **B** ___ + ___ + ___ + ___ = 17

3. **A** ___ + ___ + ___ = 16 **B** ___ + ___ + ___ + ___ = 18

Try it with a new set of cards.



First Equation: **Check:**

4. **A** ___ + ___ + ___ = 17 **B** ___ + ___ + ___ + ___ + ___ = 14

5. **A** ___ + ___ + ___ = 12 **B** ___ + ___ + ___ + ___ + ___ = 19

6. **A** ___ + ___ + ___ = 16 **B** ___ + ___ + ___ + ___ + ___ = 15

7. **A** ___ + ___ + ___ = 13 **B** ___ + ___ + ___ + ___ + ___ = 18

Make a set of cards and equation pairs of your own. Try them on a classmate.

Finding Sums

1. Find the sums.

A
$$\begin{array}{r} 37 \\ +85 \\ \hline \end{array}$$

B
$$\begin{array}{r} 68 \\ +92 \\ \hline \end{array}$$

C
$$\begin{array}{r} 764 \\ +849 \\ \hline \end{array}$$

D
$$\begin{array}{r} 967 \\ +868 \\ \hline \end{array}$$

E
$$\begin{array}{r} 7643 \\ +4829 \\ \hline \end{array}$$

F
$$\begin{array}{r} 763 \\ 842 \\ +976 \\ \hline \end{array}$$

G
$$\begin{array}{r} 934 \\ 821 \\ +109 \\ \hline \end{array}$$

H
$$\begin{array}{r} 846 \\ 738 \\ +426 \\ \hline \end{array}$$

I
$$\begin{array}{r} 7427 \\ 8368 \\ +7210 \\ \hline \end{array}$$

J
$$\begin{array}{r} 6243 \\ 9605 \\ +7876 \\ \hline \end{array}$$

K
$$\begin{array}{r} 6374 \\ 8675 \\ +3294 \\ \hline \end{array}$$

L
$$\begin{array}{r} 8467 \\ 5396 \\ +9810 \\ \hline \end{array}$$

M
$$\begin{array}{r} 7654 \\ 8339 \\ 7465 \\ +8376 \\ \hline \end{array}$$

N
$$\begin{array}{r} 9462 \\ 8487 \\ 6538 \\ +9567 \\ \hline \end{array}$$

O
$$\begin{array}{r} 35{,}678 \\ 97{,}605 \\ 38{,}765 \\ +92{,}768 \\ \hline \end{array}$$

2. Make some addition problems of your own that have these sums.
Have a classmate check your problems.

A
$$\begin{array}{r} \square\square \\ +\square\square \\ \hline 134 \end{array}$$

B
$$\begin{array}{r} \square\square\square \\ +\square\square\square \\ \hline 1463 \end{array}$$

C
$$\begin{array}{r} \square\square\square \\ +\square\square\square \\ \hline 1962 \end{array}$$

D
$$\begin{array}{r} \square\square\square\square \\ +\square\square\square\square \\ \hline 15{,}030 \end{array}$$

E
$$\begin{array}{r} \square\square \\ \square\square \\ +\square\square \\ \hline 192 \end{array}$$

F
$$\begin{array}{r} \square\square\square \\ \square\square\square \\ +\square\square\square \\ \hline 2364 \end{array}$$

G
$$\begin{array}{r} \square\square\square \\ \square\square\square \\ +\square\square\square \\ \hline 2865 \end{array}$$

H
$$\begin{array}{r} \square\square\square\square \\ \square\square\square\square \\ +\square\square\square\square \\ \hline 29{,}030 \end{array}$$

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Magic Squares

1. Complete each square to make it a magic square.

A

8	9	4
3		11
	5	

B

12		
7		
8	13	

C

		14
	11	7
		12

D

14	9	13	
4		7	16
3	12		15
17	6	10	

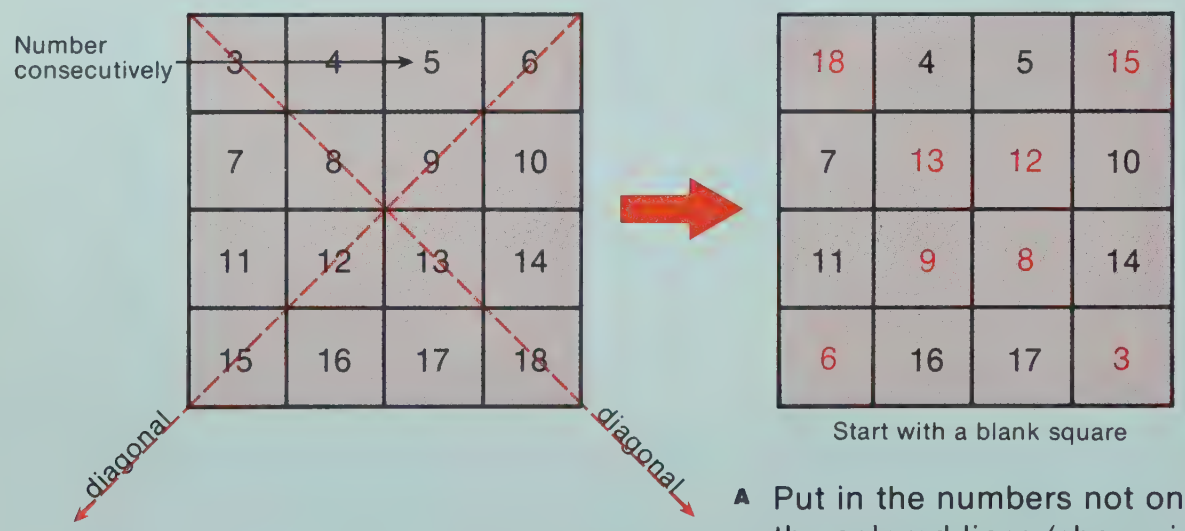
E

8	13	9	20
18		15	6
19			
	16	12	

F

		2	
4		9	7
8			11
3	13	14	0

2. Follow directions to make your own 4 by 4 magic square.



18	4	5	15
7	13	12	10
11	9	8	14
6	16	17	3

Start with a blank square

A Put in the numbers not on the colored lines (shown in black above).

B Reverse the diagonals as shown in red above.

3. Now you make a magic square using a different set of consecutive numbers.

Subtracting

1. Find the differences.

A $72 - 37$

B $346 - 179$

C $6302 - 1445$

D $7435 - 896$

E $30{,}265 - 17{,}283$

F $1000 - 6$

G $10{,}000 - 1$

H $100{,}000 - 100$

I $100{,}000 - 900$

J $100{,}000 - 10{,}101$

K $604 - 138$

L $700 - 248$

M $6003 - 5276$

N $70{,}304 - 13{,}678$

O $60{,}003 - 7{,}438$

P $50{,}901 - 12{,}493$

2. Solve the equations.

A $3465 - 1783 = n$

B $6204 - 3466 = n$

C $7004 - 838 = n$

D $9682 - 99 = n$

E $4003 - 764 = n$

F $7765 - 693 = n$

3. Make some subtraction problems of your own that have these differences. Have a classmate check your problems.

A $\square\square\square - \square\square = 344$

B $\square\square\square - \square\square = 28$

C $\square\square\square - \square\square = 73$

D $\square\square\square\square - \square\square\square = 1642$

E $\square\square\square - \square\square = 307$

F $\square\square\square\square - \square\square\square = 2834$

G $\square\square\square\square - \square\square\square = 3076$

H $\square\square\square\square\square - \square\square\square\square = 4369$

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Reconstruction Problems

1. Fill in the missing digits.

A
$$\begin{array}{r} 7\square 3 \\ -158 \\ \hline 565 \end{array}$$

B
$$\begin{array}{r} \square 16 \\ -342 \\ \hline 74 \end{array}$$

C
$$\begin{array}{r} 7823 \\ -156\square \\ \hline 6263 \end{array}$$

D
$$\begin{array}{r} 6252 \\ -134\square \\ \hline 4903 \end{array}$$

E
$$\begin{array}{r} 3\square 2 \\ -106 \\ \hline 236 \end{array}$$

F
$$\begin{array}{r} \square\square 5 \\ -\ 38 \\ \hline 667 \end{array}$$

G
$$\begin{array}{r} 5\square 38 \\ -\ 159 \\ \hline 54\square 9 \end{array}$$

H
$$\begin{array}{r} 36\square\square \\ -1\square 64 \\ \hline \square 940 \end{array}$$

I
$$\begin{array}{r} \square 00 \\ -105 \\ \hline 5\square 5 \end{array}$$

J
$$\begin{array}{r} \square 4\square \\ -\ 59 \\ \hline 6\square 4 \end{array}$$

K
$$\begin{array}{r} \square 0\square 0 \\ -\ 48\square \\ \hline 6\square 72 \end{array}$$

L
$$\begin{array}{r} 9\square\square 1 \\ -\ 83\square \\ \hline \square 168 \end{array}$$

2. Can you decide whether the problem is addition or subtraction, without seeing the missing digits? Put the correct sign (+) or (−) in the ◯.

A
$$\begin{array}{r} \square\square \\ \bigcirc\square\square \\ \hline \square\square \end{array}$$

B
$$\begin{array}{r} \square\square \\ \bigcirc\square\square \\ \hline \square\square \end{array}$$

C
$$\begin{array}{r} \square\square \\ \bigcirc\square\square \\ \hline \square\square \end{array}$$

D
$$\begin{array}{r} \square\square \\ \bigcirc\square\square \\ \hline \square\square \end{array}$$

E
$$\begin{array}{r} \square\square\square \\ \bigcirc\square\square \\ \hline 9\square\square \end{array}$$

F
$$\begin{array}{r} \square\square\square \\ \bigcirc\square\square \\ \hline 1\square\square \end{array}$$

G
$$\begin{array}{r} \square 6\square \\ \bigcirc\square 08 \\ \hline \square 53 \end{array}$$

H
$$\begin{array}{r} 9\square\square \\ \bigcirc 7\square \\ \hline \square\square \end{array}$$

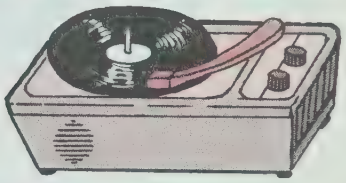
Solving Problems

Read the problem carefully. Then put in numbers that make sense.
Solve your problem.

1. Jefferson School has _____ members in the band. Lincoln School has _____. How many more does Lincoln School have?

2. Ted had _____ tickets to sell for the school play. Lynn had _____. How many did they have in all?

3. Ginny had _____ records. She bought _____ new ones and gave away _____. How many does she have now?



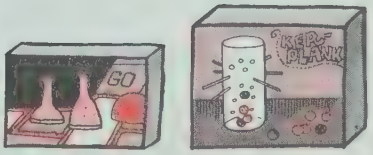
4. Joe had _____ baseball cards. He gave ____ to Fred and _____ to Jerry. How many does he have left?

5. Mary had _____ dollars. She spent _____ for socks and _____ for gloves. How much does she have left?

6. Harry earned _____ for mowing a lawn and _____ cleaning the garage. He spent _____ for a snack. How much does he have left from his earnings?

7. Ann earned _____ in one week for baby sitting. She earned _____ the next week and _____ the third week. How much did she earn in three weeks?

8. Larry had _____ dollars. How much change should he get if he bought 2 games at _____ each?



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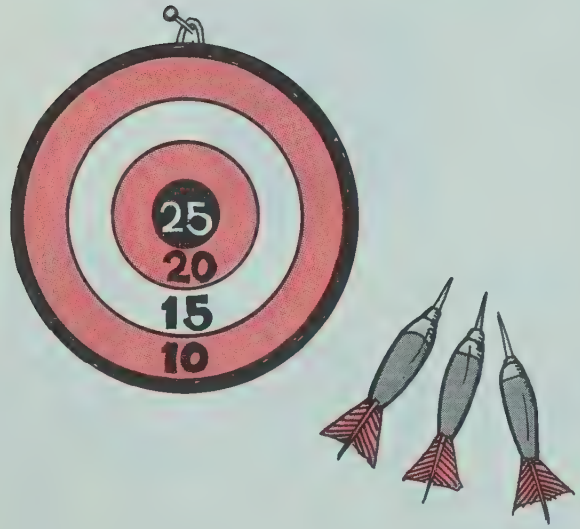
Writing Your Own Problems

Write and solve your own story problem for each picture.

1.

2.

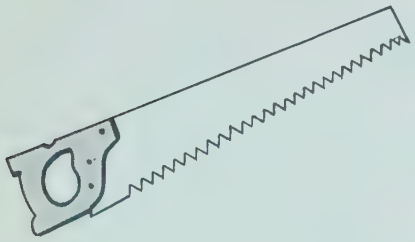


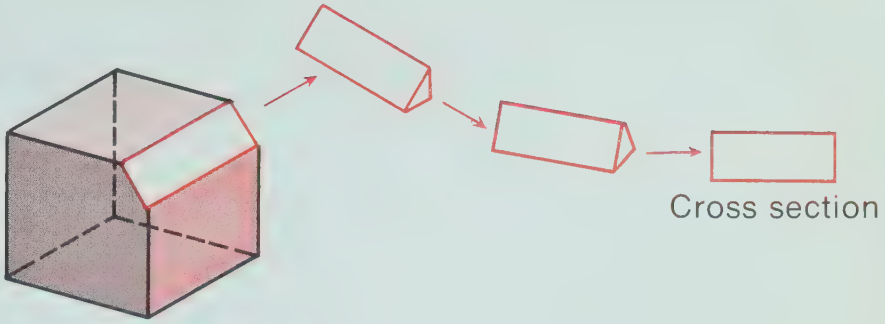
3.

Population Figures	
City	Pop.
Marysville	23,487
Greensbury	56,103
Middletown	7,286
Rockton	103,785

Cutting Cubes

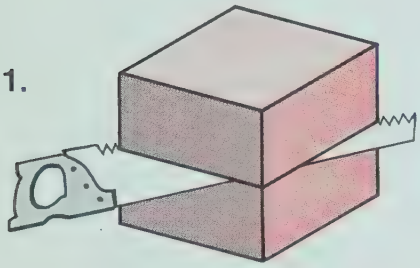
The figure below explains a cross section.
Think of cutting a piece off of a cube.





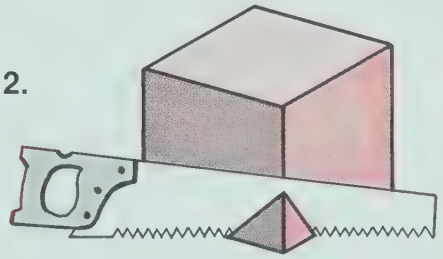
Draw a picture of the cross section for each cut shown below.
Part 1 is an example.

1.



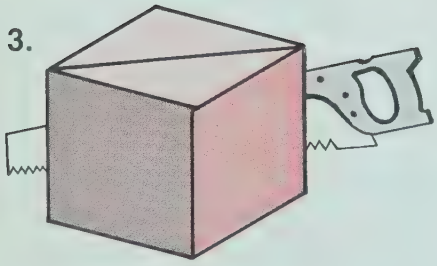
Cross section

2.



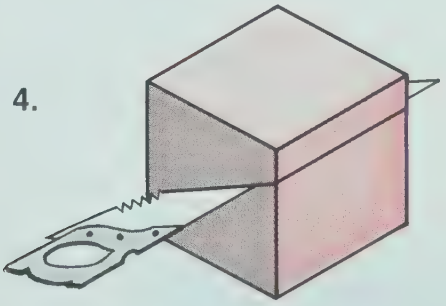
Cross section

3.



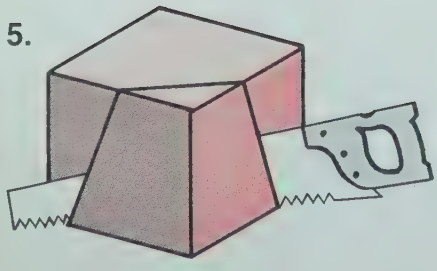
Cross section

4.



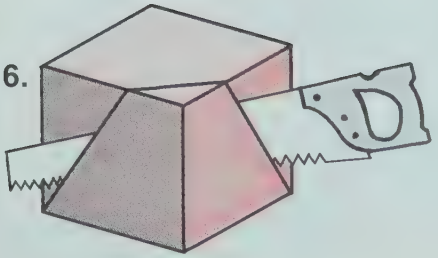
Cross section

5.



Cross section

6.



Cross section

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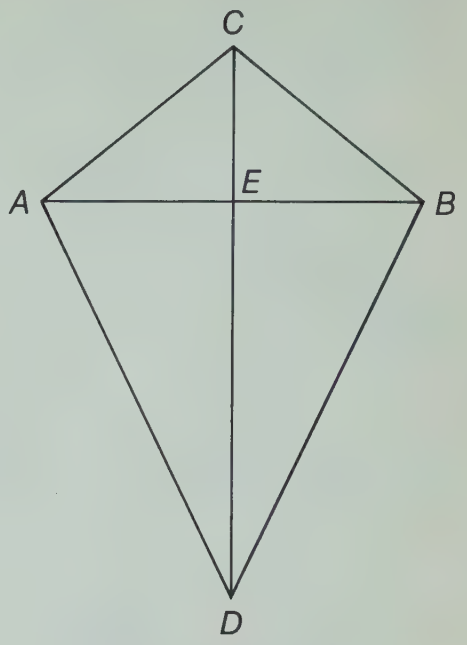
Segments, Rays, and Angles

1. How many segments can you find and name on this figure?

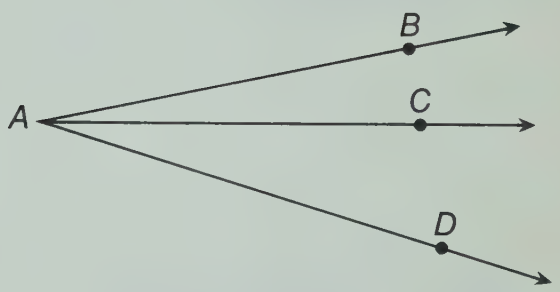


_____ _____ _____ _____

_____ _____ _____ _____

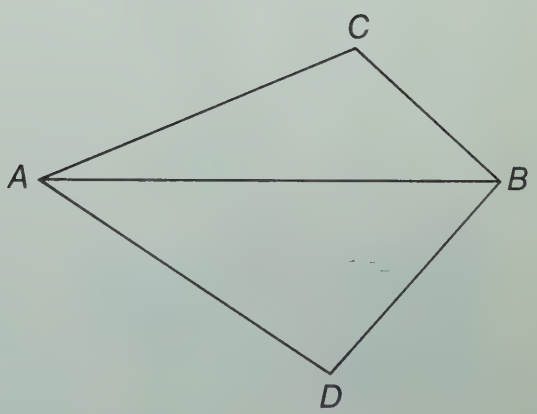
_____ _____

2. This figure shows 3 angles, *BAC*, *BAD*, and *CAD*. Draw another ray from point *A*. Put a point *E* on your ray. Name as many "new" angles as you can.



_____ _____ _____

3. How many angles can you find and name on this figure?



_____ _____ _____ _____

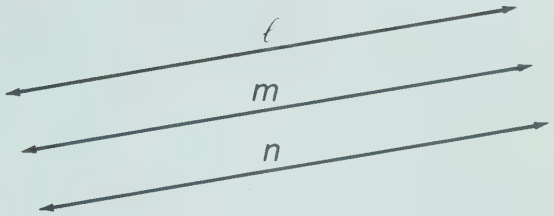
_____ _____ _____ _____

Parallel Lines

1. The symbol for parallel is ∥.

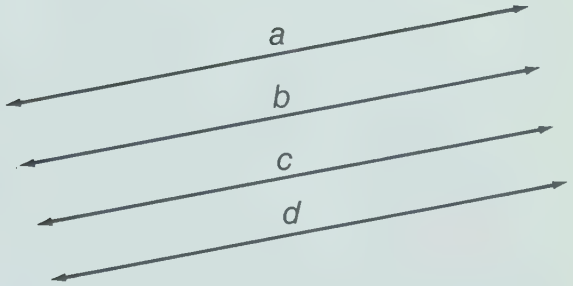
We write $\ell \parallel m$ and read "ℓ is parallel to m"

What other pairs of parallel lines can you find and record in the picture?



_____ _____

2. How many pairs of parallel lines can you name in this figure?

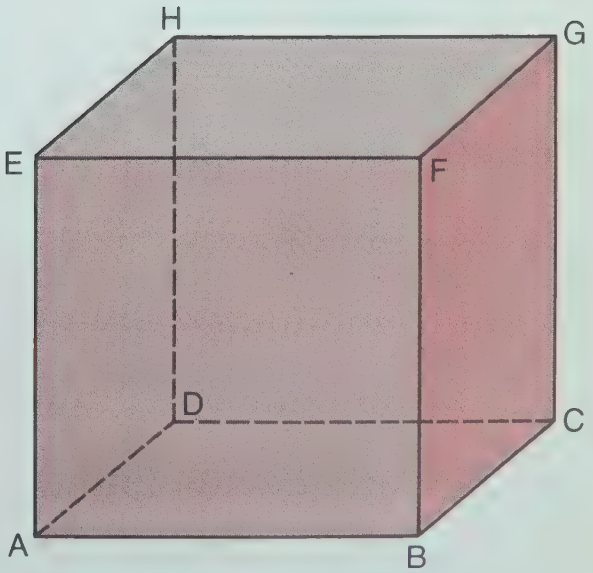


_____ _____ _____

_____ _____ _____

3. How many pairs of parallel edges can you find on the cube? Three of them are given below.

AB ∥ EF AB ∥ HG AB ∥ DC



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Space Figures

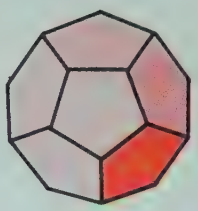
Here are two interesting geometric figures. You can make them with the patterns shown below. Can you give the number of faces, edges, and vertices of each figure?

Icosahedron

Faces _____

Edges _____

Vertices _____

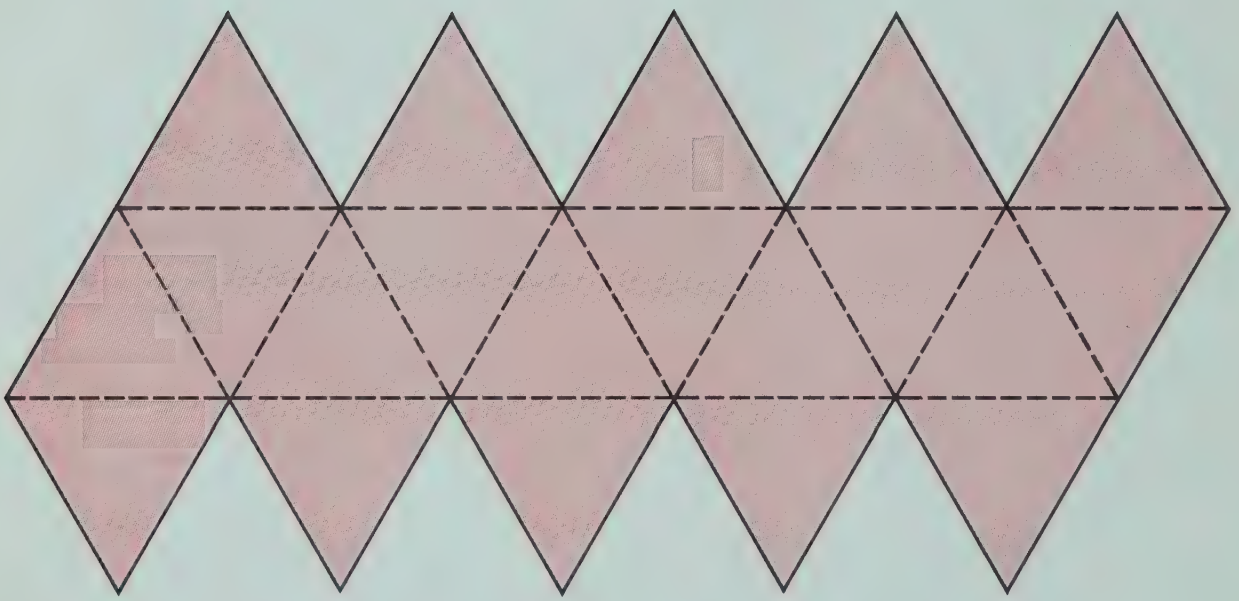


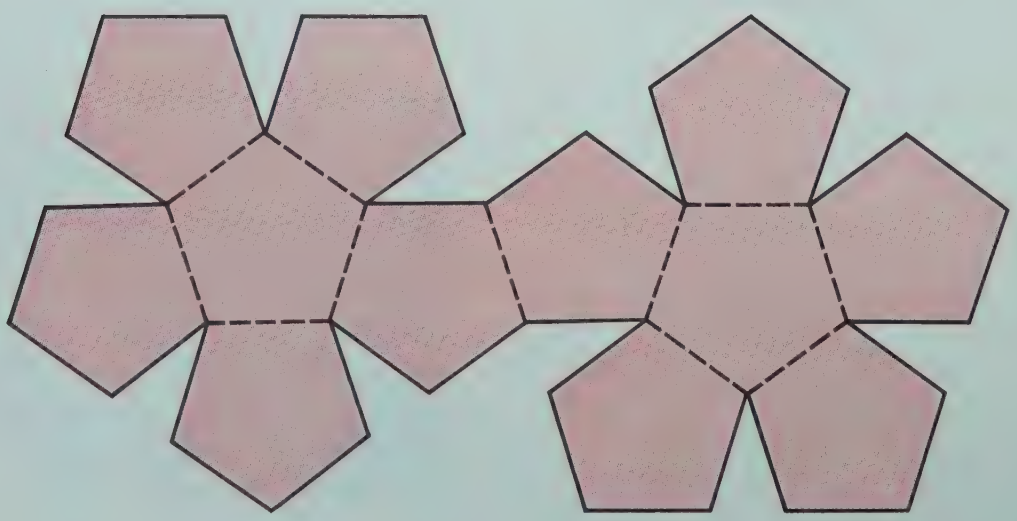
Dodecahedron

Faces _____

Edges _____

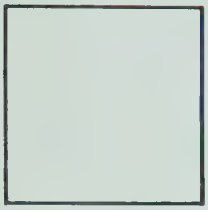
Vertices _____



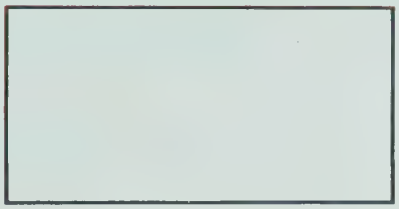


Polygons

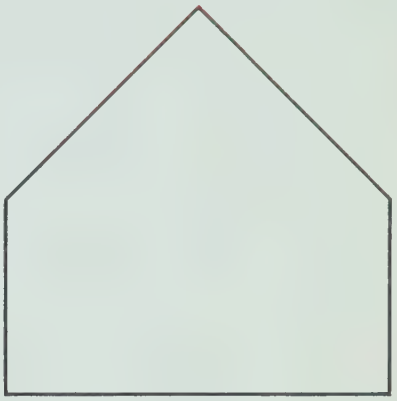
Trace and cut out two of each triangle. Use some or all of your triangles to make these special polygons. Draw lines inside the figures to show how you placed the triangles.



Square

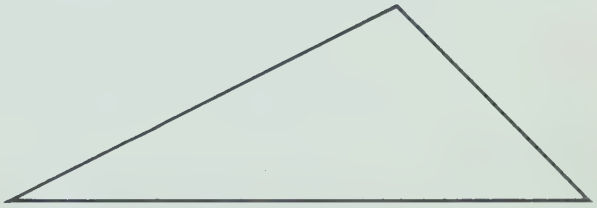


Rectangle



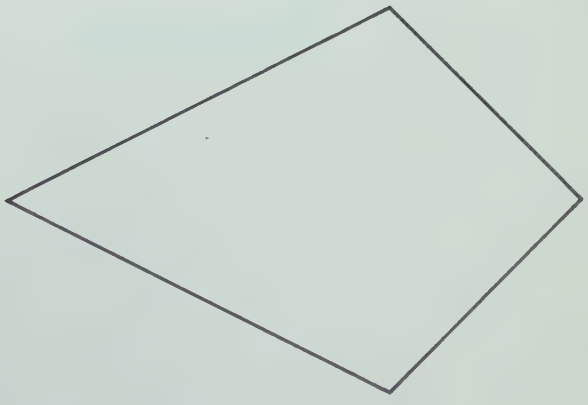
Pentagon

Parallelogram

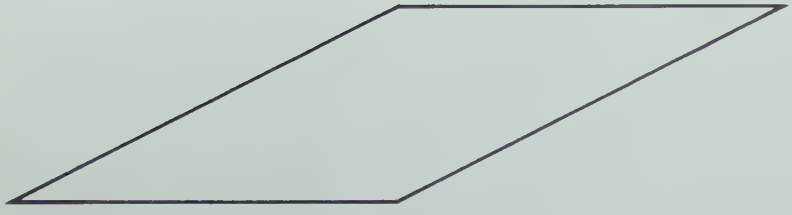


Triangle

Trapezoid



Quadrilateral



Parallelogram

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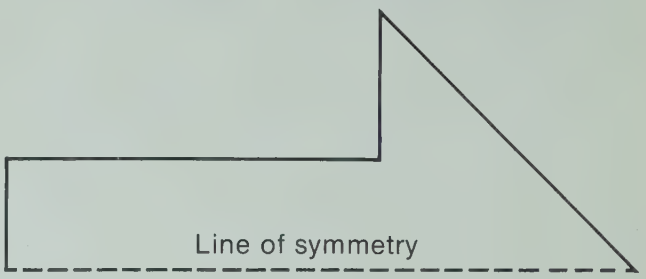
Symmetric Figures

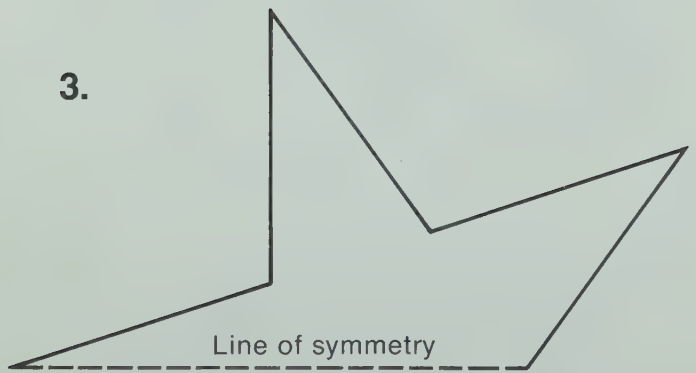
Without cutting out or folding this page, can you find a way to draw "the other half" of each figure so you have a symmetric figure.

1.

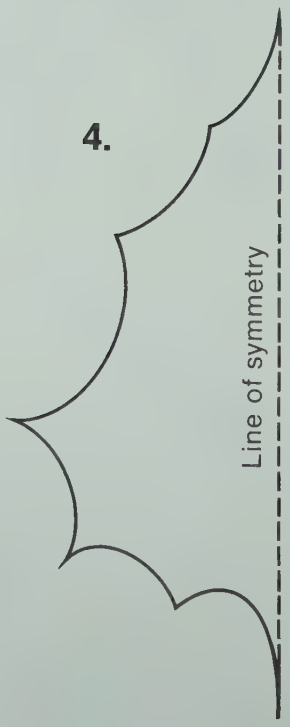
2.



3.



4.



1. Complete each sequence.

A 0 , 2 , 4 , 6 , ☐ , ☐ , ☐ , ☐ , ☐ , ☐

B 0 , 3 , 6 , 9 , ☐ , ☐ , ☐ , ☐ , ☐ , ☐

C 0 , 4 , 8 , 12 , ☐ , ☐ , ☐ , ☐ , ☐ , ☐

D 0 , 5 , 10 , 15 , ☐ , ☐ , ☐ , ☐ , ☐ , ☐

E 0 , 6 , 12 , 18 , ☐ , ☐ , ☐ , ☐ , ☐ , ☐

F 0 , 7 , 14 , 21 , ☐ , ☐ , ☐ , ☐ , ☐ , ☐

G 0 , 8 , 16 , 24 , ☐ , ☐ , ☐ , ☐ , ☐ , ☐

H 0 , 9 , 18 , 27 , ☐ , ☐ , ☐ , ☐ , ☐ , ☐

2. Solve the equations. The sequences above may help you.

A	$6 \times 2 =$ _____	$8 \times 2 =$ _____	$18 \div 2 =$ _____
B	$7 \times 3 =$ _____	$5 \times 3 =$ _____	$24 \div 3 =$ _____
C	$9 \times 4 =$ _____	$6 \times 4 =$ _____	$28 \div 4 =$ _____
D	$8 \times 5 =$ _____	$7 \times 5 =$ _____	$45 \div 5 =$ _____
E	$9 \times 6 =$ _____	$5 \times 6 =$ _____	$48 \div 6 =$ _____
F	$4 \times 7 =$ _____	$8 \times 7 =$ _____	$63 \div 7 =$ _____
G	$7 \times 8 =$ _____	$9 \times 8 =$ _____	$64 \div 8 =$ _____
H	$6 \times 9 =$ _____	$8 \times 9 =$ _____	$45 \div 9 =$ _____

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Using Logic to Find Products

1. Use the table to help you find these products.

$7 \times 8286 = 58{,}002$	
$5 \times 7654 = 38{,}270$	
$6 \times 9847 = 59{,}082$	
$4 \times 7385 = 29{,}540$	
$8 \times 3485 = 27{,}880$	
$6 \times 7856 = 47{,}136$	

A $8 \times 8286 =$ _____

B $6 \times 8286 =$ _____

C $4 \times 7654 =$ _____

D $6 \times 7654 =$ _____

E $7 \times 9847 =$ _____

F $5 \times 9847 =$ _____

G $3 \times 7385 =$ _____

H $5 \times 7385 =$ _____

I $9 \times 3485 =$ _____

J $7 \times 3485 =$ _____

K $5 \times 7856 =$ _____

L $7 \times 7856 =$ _____

2. Use this table to help you find these products.

$3 \times 786 = 2358$	$7 \times 3468 = 24{,}276$
$5 \times 786 = 3930$	$8 \times 3468 = 27{,}744$
$9 \times 786 = 7074$	$9 \times 3468 = 31{,}212$
$4 \times 963 = 3852$	$12 \times 638 = 7656$
$5 \times 963 = 4815$	$13 \times 638 = 8294$
$7 \times 963 = 6741$	$16 \times 638 = 10{,}208$

A $8 \times 786 =$ _____

B $6 \times 786 =$ _____

C $14 \times 786 =$ _____

D $12 \times 786 =$ _____

E $9 \times 963 =$ _____

F $11 \times 963 =$ _____

G $12 \times 963 =$ _____

H $8 \times 963 =$ _____

I $15 \times 3468 =$ _____

J $17 \times 3468 =$ _____

K $16 \times 3468 =$ _____

L $18 \times 3468 =$ _____

M $25 \times 638 =$ _____

N $28 \times 638 =$ _____

O $29 \times 638 =$ _____

P $32 \times 638 =$ _____

Multiplication Facts

Complete the table.

×	0	1	2	3	4	5	6	7	8	9
0										
1										
2										
3										
4										
5										
6										
7										
8										
9										

1. Which products are in the table just one time? _____

2. Some of the products are in the table exactly 3 times. How many of them can you find? _____

3. No product other than zero appears more than 4 times. How many products can you find that appear 4 times? _____

4. Choose one of your numbers from exercise 3. How many different multiplication equations can you write for your number?

_____ _____

_____ _____

_____ _____

_____ _____

_____ _____

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Multiplication Tables

1. Here is a multiplication chart with the numbers mixed up. Can you give the missing products?

×	8	2	5	9
6				
4				
7			35	
3	24			

2. These multiplication tables have both missing products and missing factors. Can you find the missing numbers in each one?

A

×				
		36		28
6			18	
	10			14
	20		12	

B

×		5		
	36			32
			6	
		10		16
	27		3	

C

×				
	18			
	6		7	
		12		8
			35	20

D

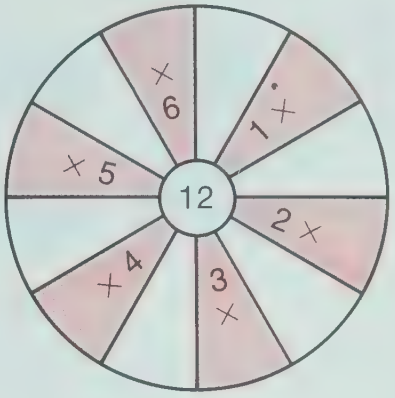
×				
		42	14	
	8			
		18		12
	9		18	

Finding Missing Factors

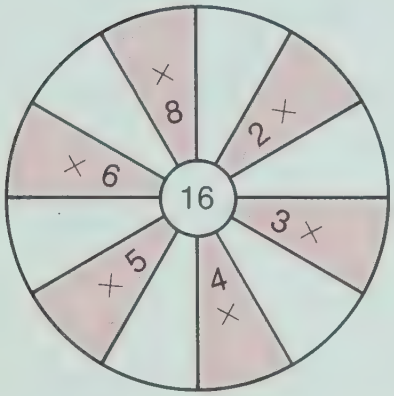
The number in the center should be the product of the two numbers on the spokes. Give as many missing spoke numbers as you can find. Some of the spokes can't be completed with whole numbers.

1.

2.

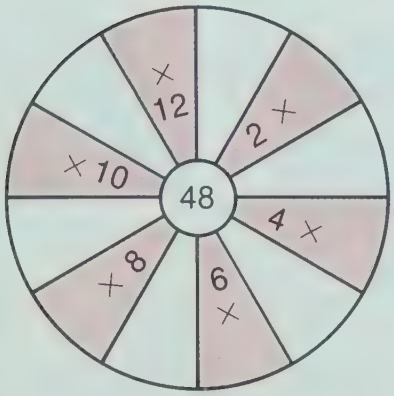


3.



4.

5.



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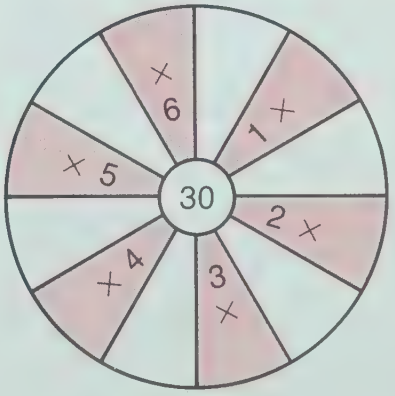
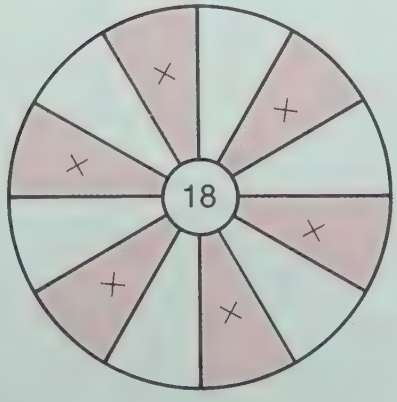


7.



8.

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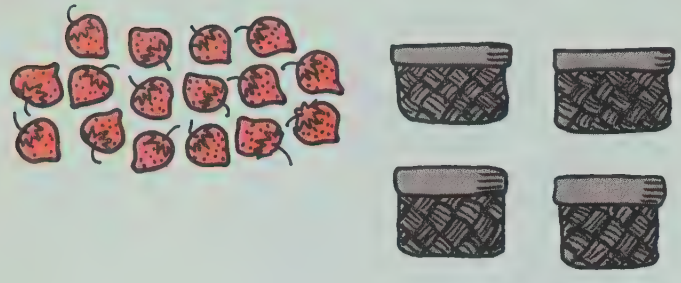
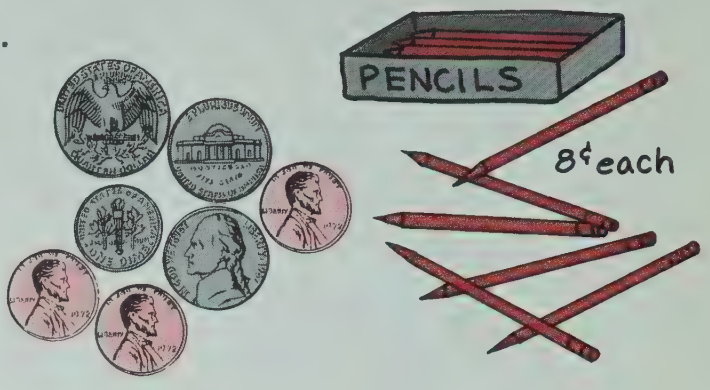
Division and Sets

Write and solve a short story problem for each picture.

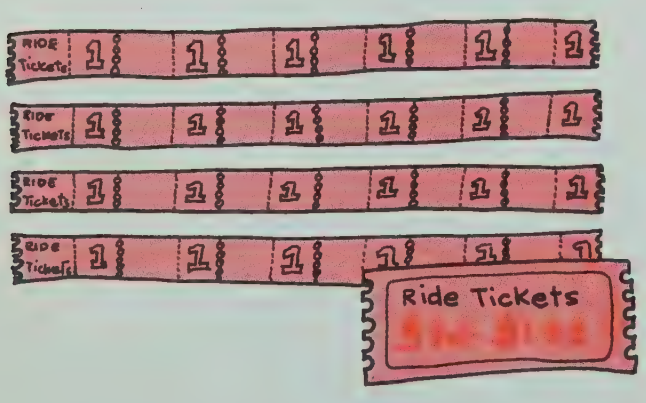
1.



2.



3.



4.

Problem Solving

1. There were 17 boys and 18 girls going on the picnic. If 5 children ride in each car,

how many cars are needed? _____

2. Put numbers in this problem that make sense. Then solve your problem.

Tam had _____ photographs. She put

_____ on each page of her album.

How many pages did she use? _____

3. Make up a multiplication problem using these numbers: 4 and 7. Then solve your problem.

4. Write a division problem using numbers of your own choosing. Solve your problem.

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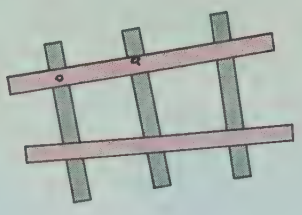
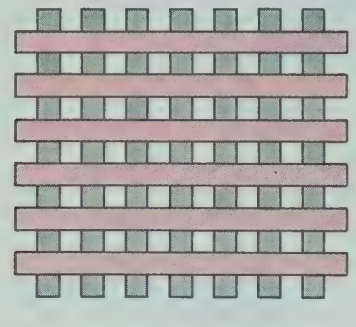
Pairing and Multiplication

1. How many nails would it take to nail 5 boards together if you put one at each crossing?

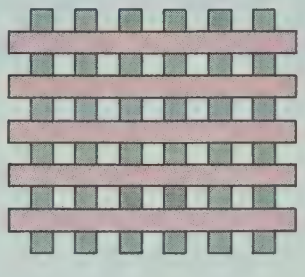


2. Give the number of nails for each of these sets of boards.

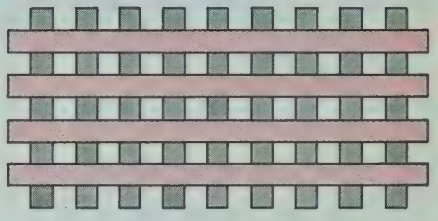
A



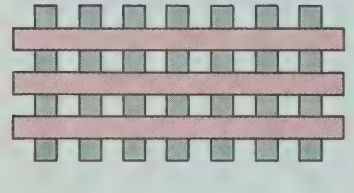
B



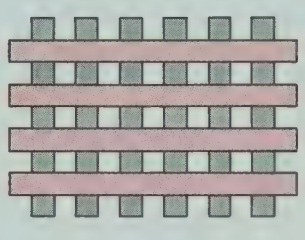
C



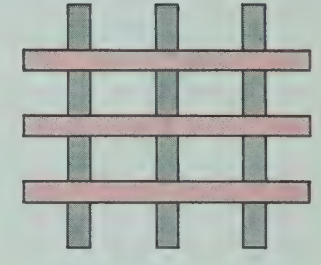
D



E

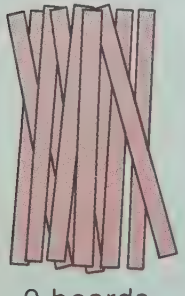


F

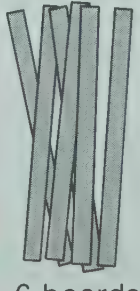


3. Give the number of nails for each of these sets of boards if they are nailed together like those above.

A



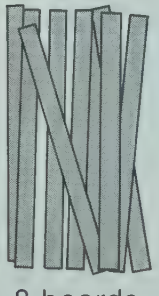
9 boards



6 boards

B

7 boards



8 boards

C

8 boards

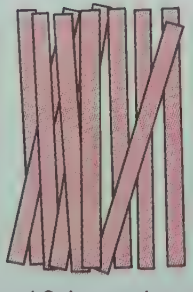
9 boards

D

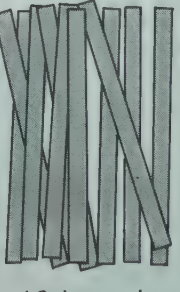
7 boards

6 boards

E



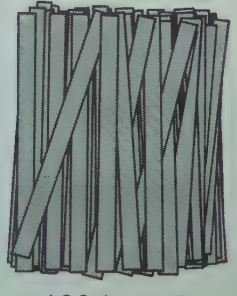
10 boards



10 boards

F

10 boards



100 boards

Finding Special Products

1. Find the products.

A $5 \times 70 =$ _____

B $5 \times 700 =$ _____

C $5 \times 7000 =$ _____

D $5 \times 70{,}000 =$ _____

E $5 \times 700{,}000 =$ _____

F $7 \times 80 =$ _____

G $7 \times 800 =$ _____

H $7 \times 8000 =$ _____

I $7 \times 80{,}000 =$ _____

J $7 \times 800{,}000 =$ _____

2. Solve the equations.

A $6 \times 8000 = n$
$n =$ 48,000

B $5 \times 3000 = n$
$n =$ _____

C $4 \times 9000 = n$
$n =$ _____

D $9 \times 30{,}000 = n$
$n =$ _____

E $8 \times 40{,}000 = n$
$n =$ _____

F $7 \times 90{,}000 = n$
$n =$ _____

G $6 \times 500{,}000 = n$
$n =$ _____

H $3 \times 700{,}000 = n$
$n =$ _____

I $8 \times 200{,}000 = n$
$n =$ _____

3. Use the table to help you solve these equations.

$10^2 = 100$	$10^4 = 10{,}000$
$10^3 = 1000$	$10^5 = 100{,}000$

A $6 \times 10^3 =$ 6000

B $7 \times 10^2 =$ _____

C $3 \times 10^5 =$ _____

D $9 \times 10^4 =$ _____

E $4 \times 10^2 =$ _____

F $8 \times 10^5 =$ _____

G $7 \times 10^3 =$ _____

H $6 \times 10^4 =$ _____

I $5 \times 10^5 =$ _____

4. Solve the equations.

A $6 \times 4 \times 10^4 =$ 240,000

B $4 \times 7 \times 10^2 =$ _____

C $7 \times 6 \times 10^3 =$ _____

D $8 \times 5 \times 10^5 =$ _____

E $9 \times 2 \times 10^3 =$ _____

F $6 \times 5 \times 10^5 =$ _____

G $2 \times 8 \times 10^4 =$ _____

H $5 \times 9 \times 10^3 =$ _____

I $7 \times 8 \times 10^2 =$ _____

J $8 \times 6 \times 10^5 =$ _____

K $3 \times 7 \times 10^3 =$ _____

L $9 \times 3 \times 10^4 =$ _____

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Finding Missing Factors

1. One of the factors in each equation should end in zero. Can you write six different equations for each product?

A 120 ___1___ × ___120___ = 120 ___ × ___ = 120 ___ × ___ = 120

___ × ___ = 120 ___ × ___ = 120 ___ × ___ = 120

B 180 ___ × ___ = 180 ___ × ___ = 180 ___ × ___ = 180

___ × ___ = 180 ___ × ___ = 180 ___ × ___ = 180

C 240 ___ × ___ = 240 ___ × ___ = 240 ___ × ___ = 240

___ × ___ = 240 ___ × ___ = 240 ___ × ___ = 240

2. Solve the equations.

A $4 \times n \times 10^3 = 24{,}000$

$n =$ ___6___

B $n \times 8 \times 10^4 = 480{,}000$

$n =$ _____

C $2 \times n \times 10^4 = 180{,}000$

$n =$ _____

D $n \times 8 \times 10^2 = 3200$

$n =$ _____

E $6 \times n \times 10^2 = 1200$

$n =$ _____

F $n \times 4 \times 10^3 = 20{,}000$

$n =$ _____

G $3 \times n \times 10^3 = 21{,}000$

$n =$ _____

H $n \times 3 \times 10^5 = 2{,}100{,}000$

$n =$ _____

I $5 \times n \times 10^5 = 3{,}000{,}000$

$n =$ _____

3. When multiples of ten are expressed as 10^2, 10^3, 10^4, and 10^5, they are called **powers of ten.** Give the correct power of ten for each equation.

A $5 \times 7 \times n = 3500$

$n =$ ___10²___

B $4 \times 8 \times n = 32{,}000$

$n =$ _____

C $7 \times 6 \times n = 420{,}000$

$n =$ _____

D $5 \times 9 \times n = 45{,}000$

$n =$ _____

E $8 \times 9 \times n = 7200$

$n =$ _____

F $6 \times 4 \times n = 2{,}400{,}000$

$n =$ _____

Finding Special Quotients

1. Give the correct power of ten for each equation.

A $3500 \div 5 = 7 \times n$

$n = 10^2$

B $24{,}000 \div 6 = 4 \times n$

$n =$ _____

C $4200 \div 7 = 6 \times n$

$n =$ _____

D $28{,}000 \div 4 = 7 \times n$

$n =$ _____

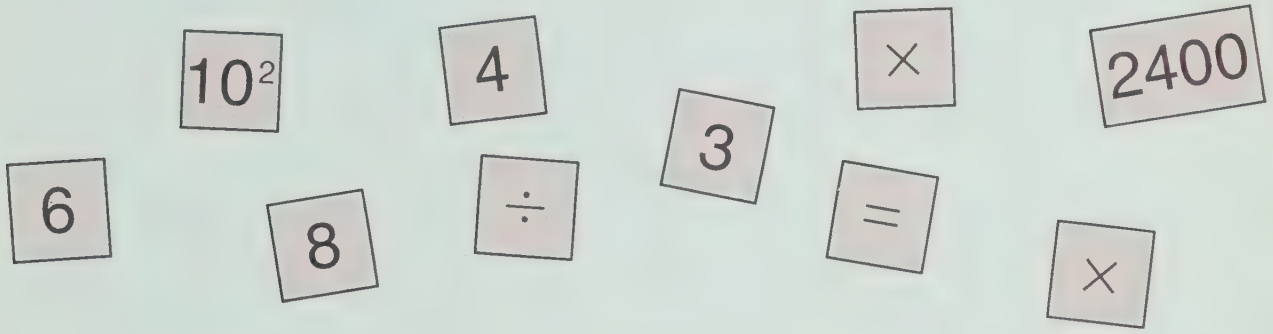
E $180{,}000 \div 6 = 3 \times n$

$n =$ _____

F $27{,}000 \div 3 = 9 \times n$

$n =$ _____

2. How many different equations can you write using the symbols on these cards?



EXAMPLES:

or

$2400 \div 8 = 3 \times 10^2$

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Factors with Zeros

Put in some zeros so the equations are correct and different.

1. 3____ × 8____ = 2400

3____ × 8____ = 2400

3____ × 8____ = 2400

2. 7____ × 4____ = 2800

7____ × 4____ = 2800

7____ × 4____ = 2800

3. 5____ × 6____ = 3000

5____ × 6____ = 3000

5____ × 6____ = 3000

4. 9____ × 7____ = 6300

9____ × 7____ = 6300

9____ × 7____ = 6300

5. 6____ × 8____ = 48,000

6____ × 8____ = 48,000

6____ × 8____ = 48,000

6. 8____ × 5____ = 40,000

8____ × 5____ = 40,000

8____ × 5____ = 40,000

7. 3____ × 9____ = 270,000

3____ × 9____ = 270,000

3____ × 9____ = 270,000

8. 5____ × 4____ = 200,000

5____ × 4____ = 200,000

5____ × 4____ = 200,000

9. 9____ × 6____ = 54____

9____ × 6____ = 54____

9____ × 6____ = 54____

9____ × 6____ = 54____

9____ × 6____ = 54____

10. 5____ × 2____ = 1____

5____ × 2____ = 1____

5____ × 2____ = 1____

5____ × 2____ = 1____

5____ × 2____ = 1____

Finding Special Quotients

1. Fill in the missing numbers in each multiplication table.

A

×	100					
4	400	1200				20,000
6		1800		6000		
5	500	1500	3000		20,000	
7			4200		28,000	

B

×						
40	800		1200		3200	
70	1400	2800	2100	4200		
20	400					1000
60	1200	2400				

C

×						
50			20,000			
80		24,000		16,000		40,000
30	3000					
90					72,000	

2. Put in some zeros so the equations are different and correct.

A 1400 ÷ 7_____ = 2_____

1400 ÷ 7_____ = 2_____

1400 ÷ 7_____ = 2_____

B 3200 ÷ 4_____ = 8_____

3200 ÷ 4_____ = 8_____

3200 ÷ 4_____ = 8_____

C 4000 ÷ 5_____ = 8_____

4000 ÷ 5_____ = 8_____

4000 ÷ 5_____ = 8_____

D 7200 ÷ 8_____ = 9_____

7200 ÷ 8_____ = 9_____

7200 ÷ 8_____ = 9_____

E 45,000 ÷ 9_____ = 5_____

45,000 ÷ 9_____ = 5_____

45,000 ÷ 9_____ = 5_____

45,000 ÷ 9_____ = 5_____

F 30,000 ÷ 5_____ = 6_____

30,000 ÷ 5_____ = 6_____

30,000 ÷ 5_____ = 6_____

30,000 ÷ 5_____ = 6_____

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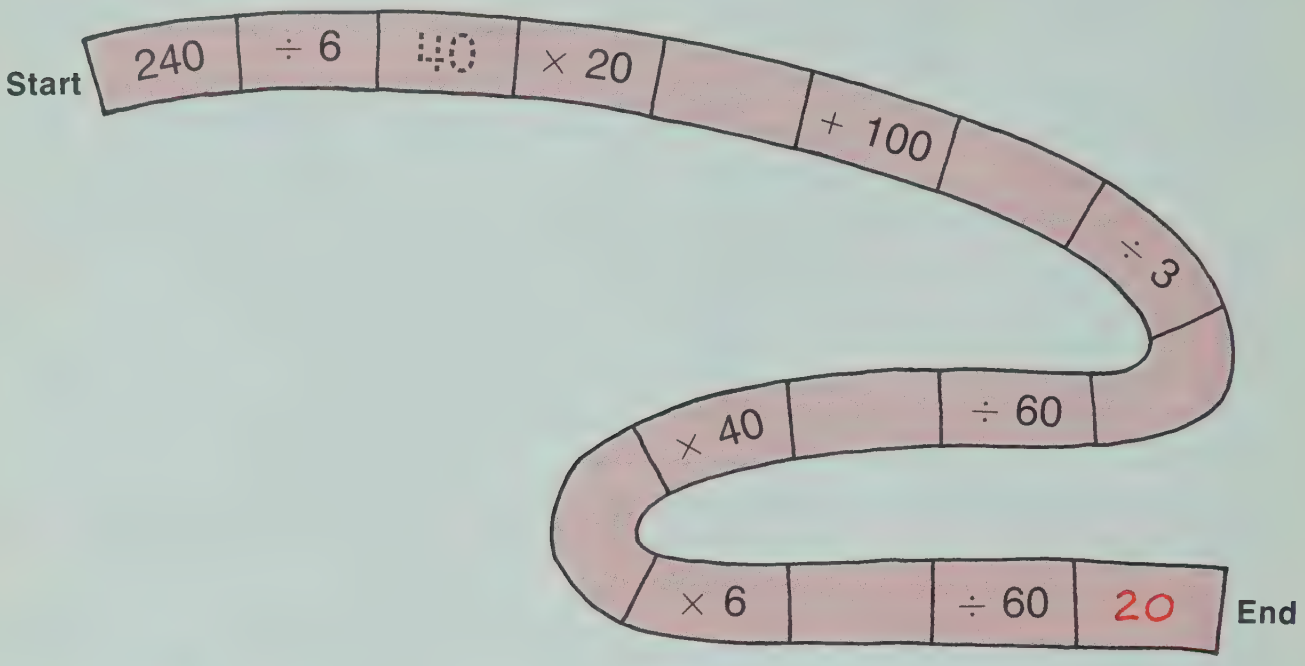
Finding Special Products and Quotients

Fill in the missing numbers. If your work is correct you should end with the number shown in red.

1.



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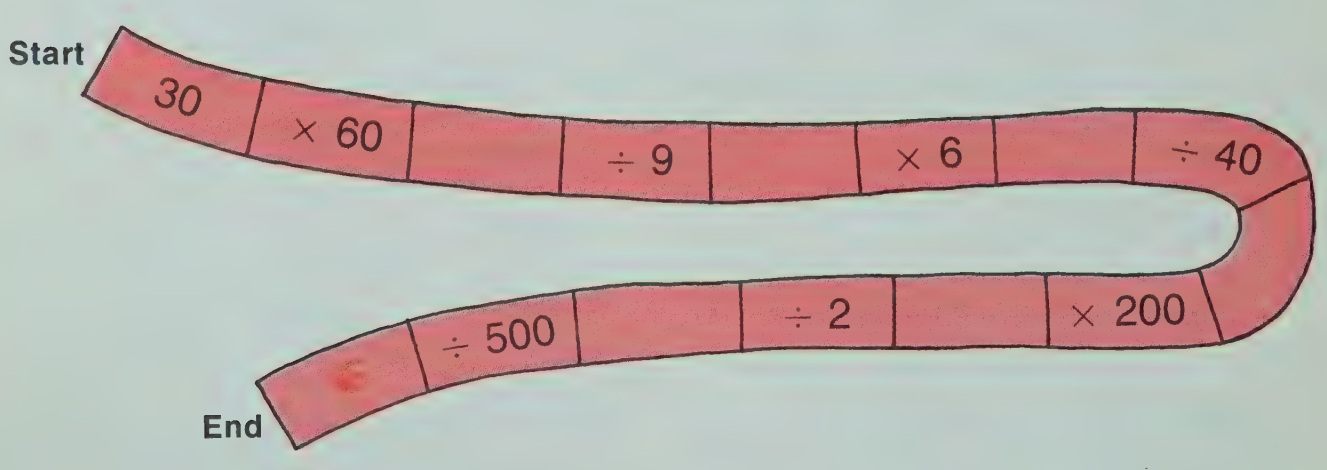

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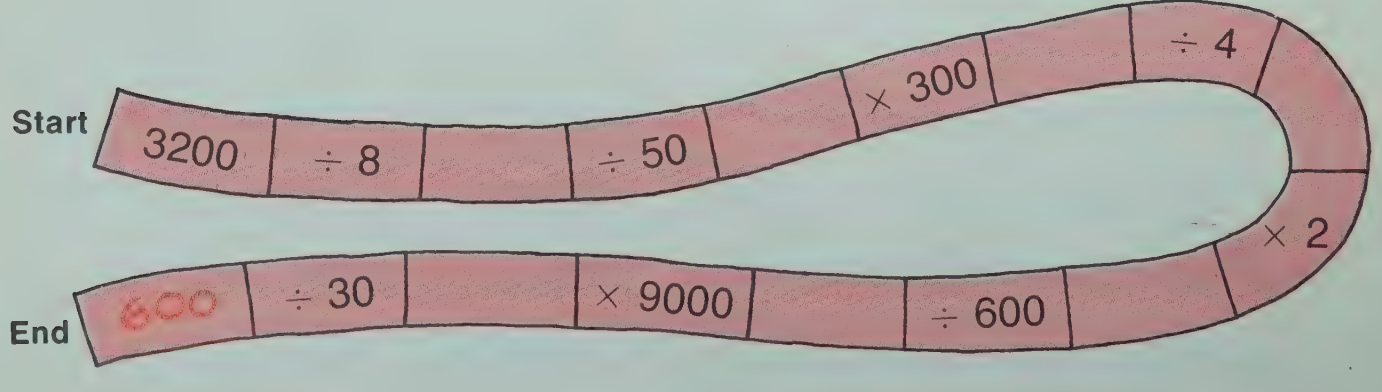
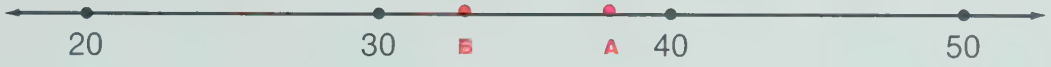


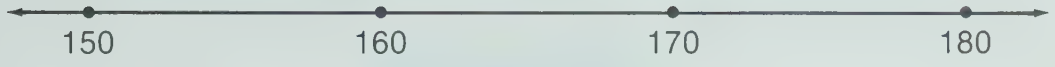
Finding Multiples of 10 and 100 for Estimates

On each number line, estimate the position of the numbers with dots as in the examples for A and B. Put the letter under each dot.

1. A 38 B 33 C 42 D 29 E 35

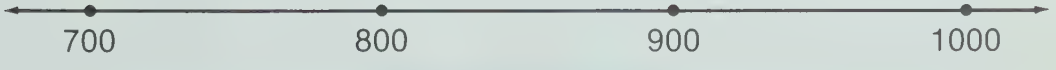


2. A 174 B 169 C 165 D 162 E 157



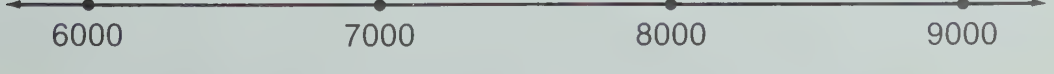
3. A 450 B 525 C 375 D 467 E 592

4. A 812 B 783 C 937 D 869 E 744



5. A 1850 B 1925 C 1775 D 1733 E 1989

6. A 8512 B 7248 C 6124 D 7896 E 6698



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Estimating Totals

1. You have this much money. Use estimation to decide which of these totals you'll be able to pay. Write "yes" or "no" on the paper.

A
$ 1.98
1.89
1.88
total: _____

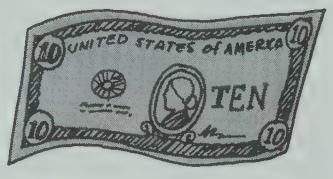
B
$.99
.98
.95
.89
.99
total: _____

C
$ 1.12
.95
1.10
.98
total: _____

D
$ 2.95
.89
1.98
total: _____

_____ _____ _____ _____

2. Which of these will you be able to pay with the $10 bill?



A
$ 2.98
3.95
1.99
.96
total: _____

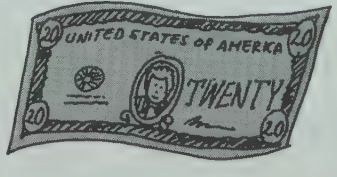
B
$ 3.79
4.88
2.49
1.10
total: _____

C
$ 1.95
1.89
1.99
1.88
1.98
total: _____

D
$ .89
4.98
1.00
2.95
.95
total: _____

_____ _____ _____ _____

3. Which of these will you be able to pay with the $20 bill?



A
$ 4.95
4.95
4.95
4.95
total: _____

B
$ 5.98
4.98
5.98
4.98
total: _____

C
$ 7.00
3.95
2.98
6.95
total: _____

D
$ 3.79
2.89
2.95
2.99
2.98
2.99
total: _____

_____ _____ _____ _____

Estimating Products

1. Fill in the estimation tables.

A

×	99	198	395	612	998	1021
3	300					
4		800			4000	
6	600		2400			
8		1600		4800		

B

×	31	39	22	47	71	89
28			600			
19	600					
42		1600				
58				3000		

C

×	98	312	195	487	208	699
32				15,000		
18		6000				
41		12,000				
69	7000					

2. Put in some numbers of your own so the estimates in the table are "close." Then complete the tables.

×						
2		100		120		600
7	140		280	420		
29		1500			3000	
52	1000		2000		5000	15,000

ESTIMATES

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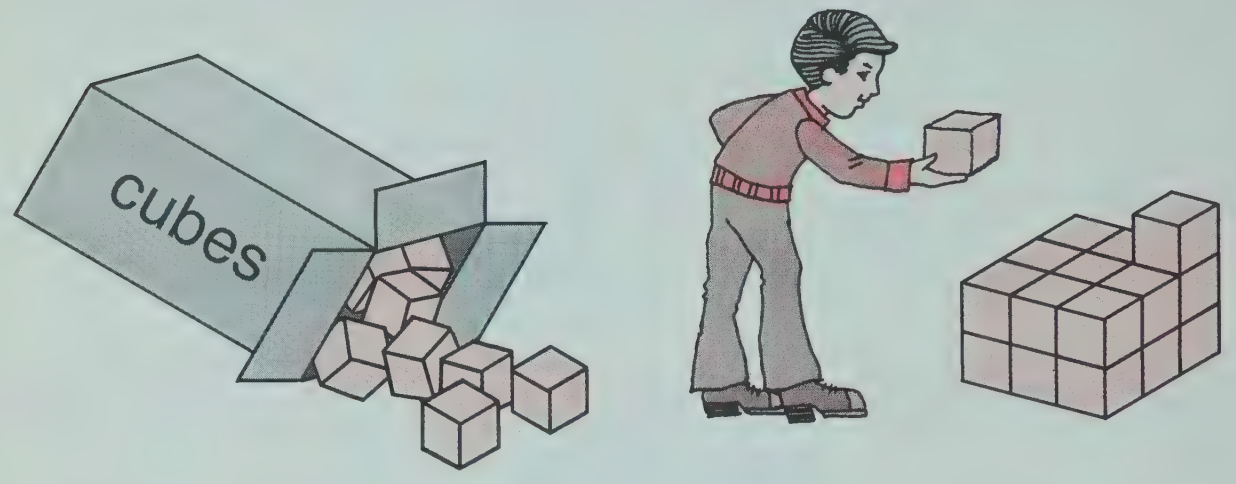
Estimating Quotients

1. Estimate about how many cubes tall this "building" would be for the different numbers of cubes.



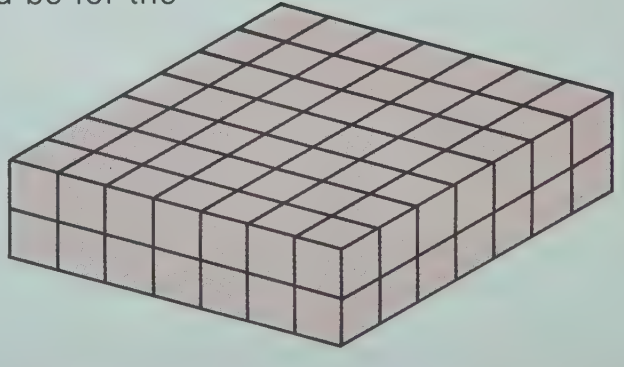
A 178 cubes. About how tall? _____

B 631 cubes. About how tall? _____

C 358 cubes. About how tall? _____

D 542 cubes. About how tall? _____

2. Estimate how tall this "building" would be for the different numbers of cubes.



A 298 cubes. About how tall? _____

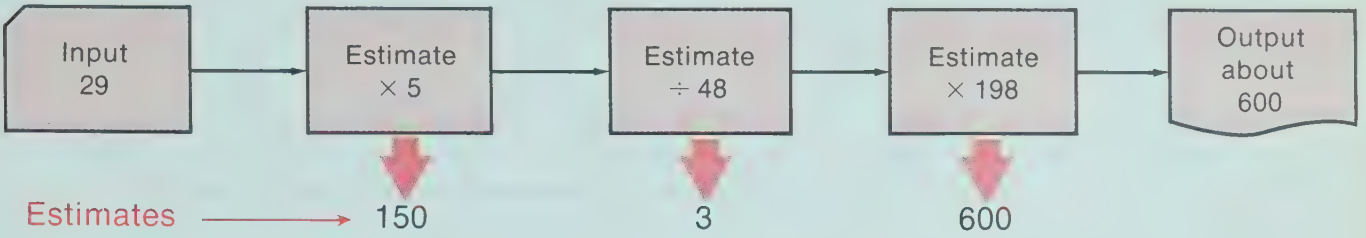
B 410 cubes. About how tall? _____

C 1498 cubes. About how tall? _____

D 3018 cubes. About how tall? _____

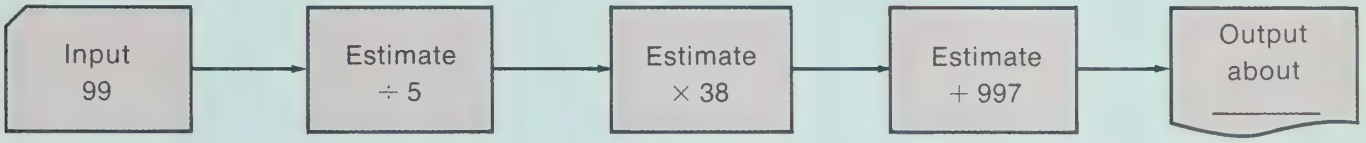
Estimating

Study the flow chart examples using estimates.

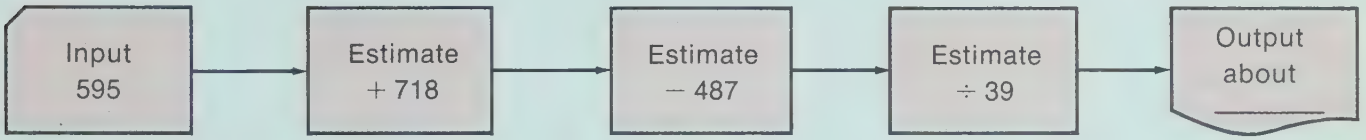


Find each output number using estimates.

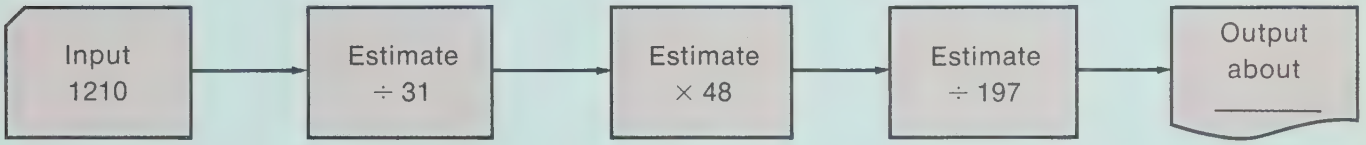
1.



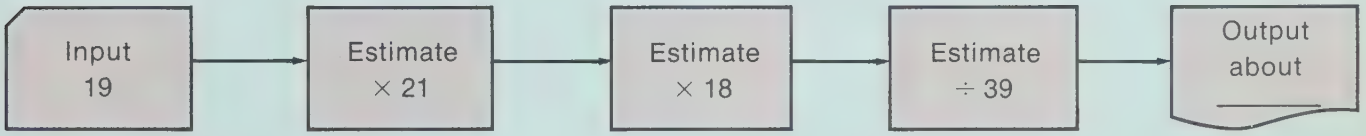
2.



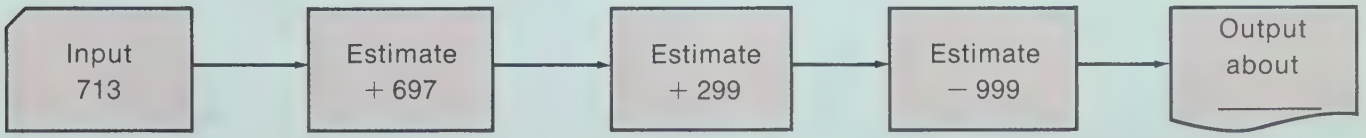
3.



4.



5.



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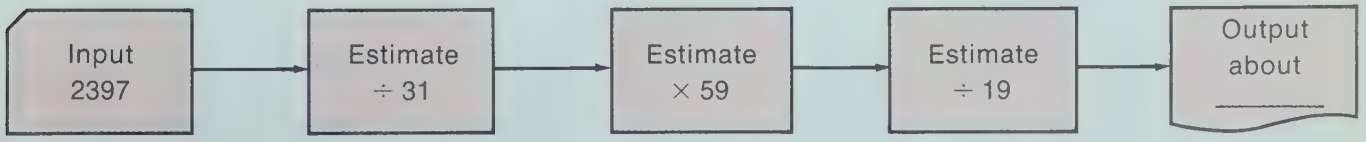

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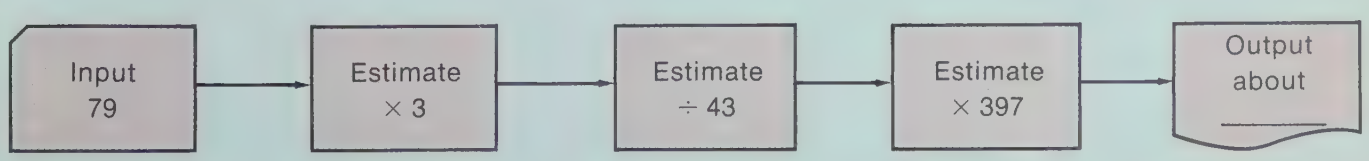

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Estimation for Fun

1.

If this length is 79 units,

then this length is

about _____ units.

2.

If this length is 19 units,

then this length is

about _____ units.

3.

If this area is 49 units,

then this area is

about _____ units.

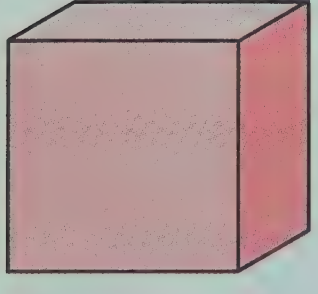
4.

If this area is 21 units,

then this area is about

_____ units.

5.



If this volume is 29 units,

then this volume is

about _____ units.

1. Grade Lisa's paper.

LISA

1.	2.	3.	4.	5.
38 × 4 = 152	57 × 2 = 114	46 × 8 = 366	92 × 7 = 644	28 × 6 = 166

6.	7.	8.	9.	10.
49 × 4 = 196	83 × 6 = 478	85 × 4 = 340	64 × 8 = 492	18 × 6 = 106

2. Each mistake Lisa made was for the same reason. Can you tell Lisa what she is doing wrong?

3. Grade Don's paper.

Don

1.	2.	3.	4.	5.
62 × 3 = 186	73 × 2 = 146	56 × 4 = 204	94 × 2 = 188	47 × 3 = 121

6.	7.	8.	9.	10.
82 × 2 = 164	43 × 3 = 129	65 × 7 = 425	42 × 3 = 126	74 × 6 = 424

4. Can you tell Don what he is doing wrong?

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Multiplying with a 3-Digit Factor

1. First estimate each product. Then find the product. Find the difference between your estimate and the correct product.

A 376 × 4

1600 estimate

1504 product

96 difference

B 483 × 6

estimate

product

difference

C 725 × 3

estimate

product

difference

D 321 × 9

estimate

product

difference

E 489 × 5

estimate

product

difference

F 7264 × 5

estimate

product

difference

G 5438 × 3

estimate

product

difference

H 6073 × 6

estimate

product

difference

I 9802 × 4

estimate

product

difference

J 3743 × 7

estimate

product

difference

2. Use addition only to complete the multiplication table. (No multiplying allowed.) Hint: 5 sixty-eights is the same as the sum of 2 sixty-eights and 3 sixty-eights.

×	68	237	435	6824	5196	7843
2	136	474	870	13,648	10,392	15,686
3	204	711	1305	20,472	15,588	23,529
5						
7						
8						
9						
17						

3. Find the products below. Check your answers in the table.

A 68 × 7

B 237 × 9

C 435 × 9

D 6824 × 8

E 5196 × 5

F 7843 × 9

Finding Missing Digits

1. Find the missing digit.

A 37 × ▢ = 148

B 52 × ▢ = 364

C 864 × ▢ = 4320

D 352 × ▢ = 2816

E 349 × ▢ = 1047

F 7283 × ▢ = 65,547

G 2465 × ▢ = 9860

H 5374 × ▢ = 26,870

I 1884 × ▢ = 3768

J 7982 × ▢ = 47,892

2. Find the missing digits.

A ▢3 × 7 = 301

B 6▢ × 5 = 345

C 53▢ × 3 = 1602

D 3▢6 × 9 = 3474

E ▢49 × 6 = 4494

F 243 × ▢ = 19,704

G 781 × ▢ = 30,324

H 6▢3 × 2 = 9246

I 76 × ▢ = 31,468

J ▢34 × 5 = 26,620

3. Find the missing digits.

A 384 × ▢ = ▢04

B ▢479 × 3 = 4▢▢▢

C 35 × 2▢ = 245 / 0▢ / 45

D ▢6 × 3 = 138 / 2760 / 2898

E 7▢ × 6 = 444 / 3700 / 4144

F ▢28 × 3▢ = 1640 / 9840 / 11,480

G 4▢7 × ▢6 = 2502 / 20850 / 23,352

H ▢5▢ × ▢3 = 1956 / 52160 / 54,116

I ▢3▢ × 1▢ = 2133 / 2370 / 4503

J ▢89 × ▢▢ = 1467 / 14670 / 16,137

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Finding Products—2 and 3-Digit Factors

1. Complete rows **A**, **B**, and **C** of the table using only addition. Put your own factors in rows **D**, **E**, **F**, and **G** so you can complete the table using addition.

Remember, no multiplying allowed.

	×	36	58	73	346	582	724
	30	1080	1740	2190	10,380	17,460	21,720
	50	1800	2900	3650	17,300	29,100	36,200
	80	2880	4640	5840	27,680	46,560	57,920
	4	144	232	292	1384	2328	2896
	7	252	406	511	2422	4074	5068
	9	324	522	657	3114	5238	6516
A	54						
B	39						
C	87						
D							
E							
F							
G							

2. Find these products and check your answers in the table.

A
$$\begin{array}{r} 58 \\ \times 39 \\ \hline \end{array}$$

B
$$\begin{array}{r} 73 \\ \times 87 \\ \hline \end{array}$$

C
$$\begin{array}{r} 346 \\ \times 54 \\ \hline \end{array}$$

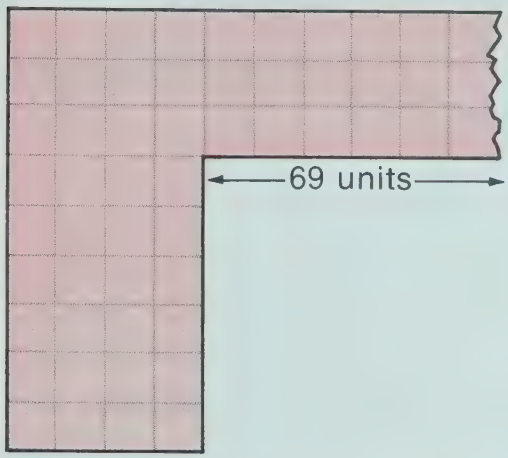
D
$$\begin{array}{r} 582 \\ \times 87 \\ \hline \end{array}$$

E
$$\begin{array}{r} 724 \\ \times 39 \\ \hline \end{array}$$

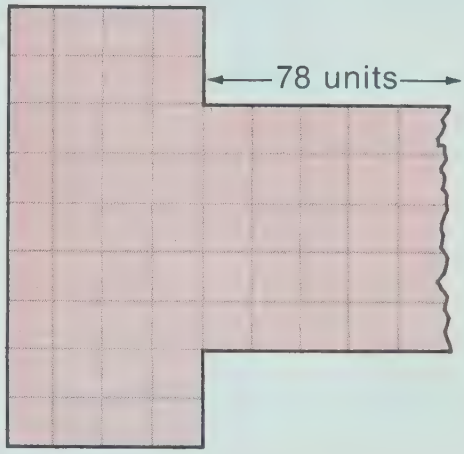
3. Check some of your own rows in the table by multiplying.

Find the area of each figure.

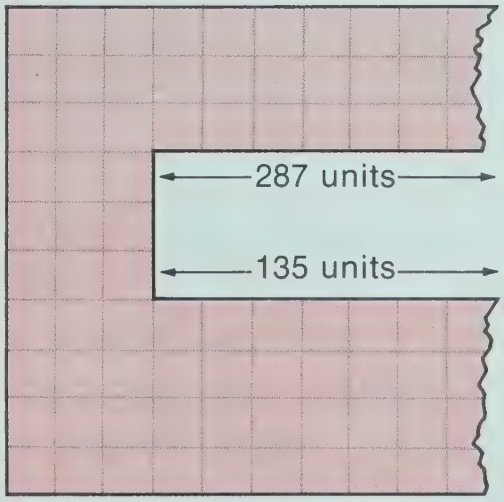
1.



2.



3.



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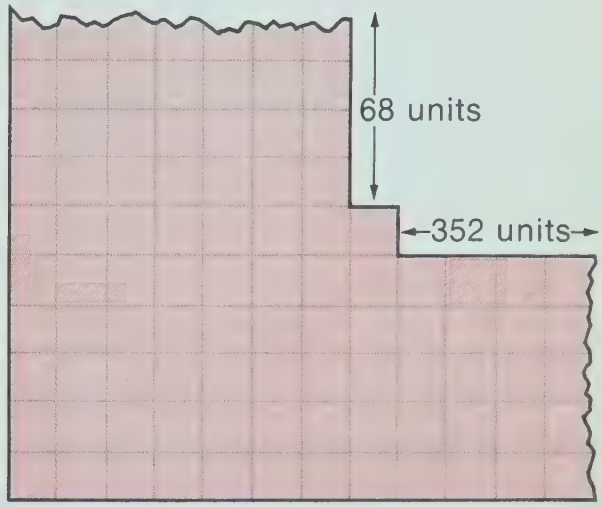
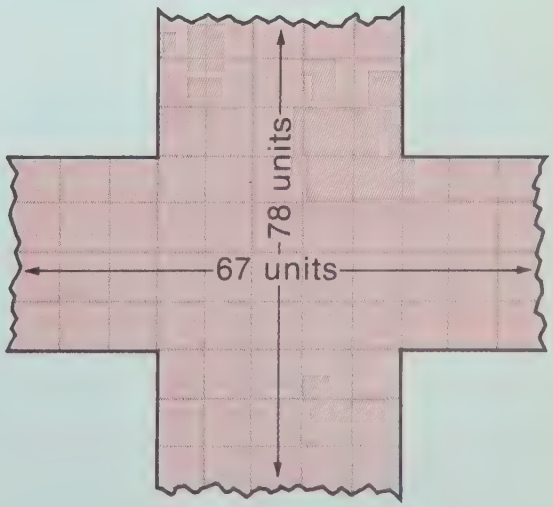


5.

6.



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Solving Problems

1. In each problem, put in numbers of your own that make sense. Then solve your problem.

A If a car travels _____ kilometers each hour, how far will

it go in _____ hours?

B One summer Patty read _____ books. The average length of the book was

about _____ pages. How many pages did she read?

C The average length of a math

lesson is _____ minutes.

Judy's class had _____ lessons in November. How many minutes of math did they have in November?

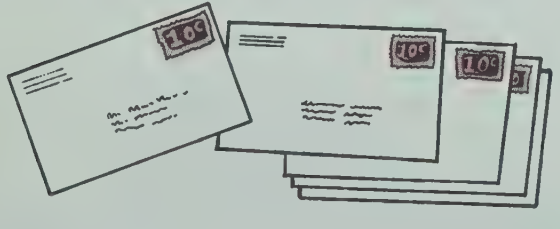
D Randy's favorite sports car sells for

about _____ dollars. The dealer

said he sold _____ of them last year. How many dollars is this in all?

2. Write and solve a multiplication problem for each picture.

A



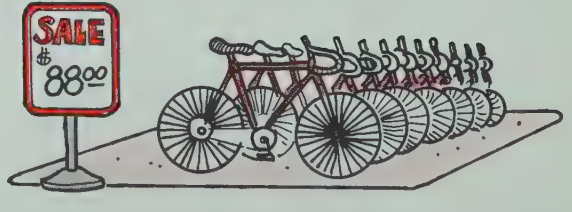
_____

_____

_____

_____

B



_____

_____

_____

_____

Larger Products

1. Make up your own multiplication problems so that each has a digit and there are no extra digits.
Have a classmate check your work.

A × ___ = ___

B × ___ = ___

C × ___ = ___

D × ___ = ___

E × ___ = ___

F × ___ = ___

G × ___ = ___

H × ___ = ___

I × ___ = ___

J × ___ = ___

K × ___ = ___

2. Make your problems as you did above only be sure the given digit is correct.

A × ___ = ___2

B × ___ = ___6

C × ___ = ___8

D × ___ = ___8

E × ___ = ___3

F × ___ = ___8

G × ___ = 4___

H × ___ = 0___

I × ___ = ___4

J × ___ = ___9

K × ___ = 3___

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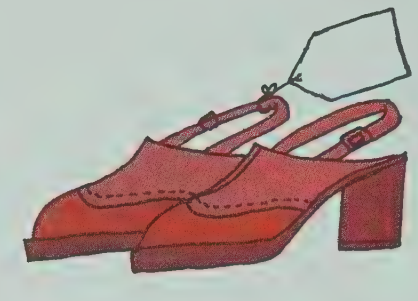
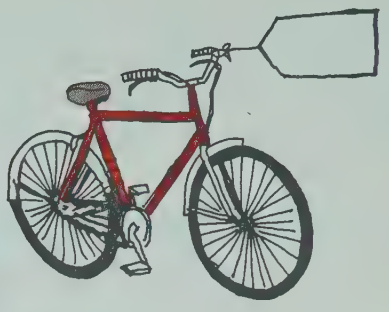
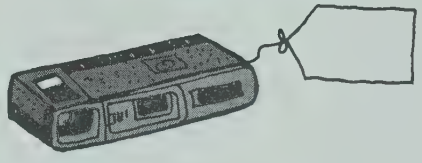
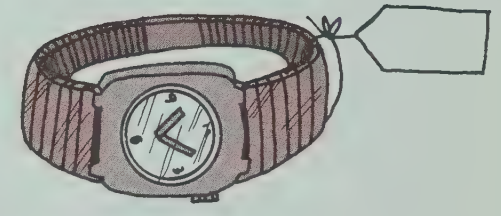
Solving Problems

Put a price on each item that you think is about "right." Then write and solve a problem about these items that uses the operation shown.









+ _____

_____

_____

_____

_____

_____

− _____

_____

_____

_____

_____

_____

× _____

_____

_____

_____

_____

_____

_____

× _____

_____

_____

_____

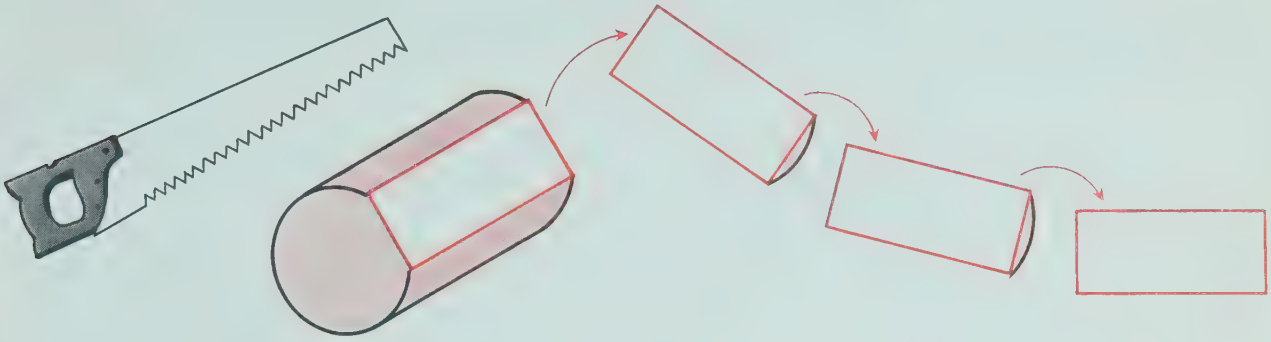
_____

_____

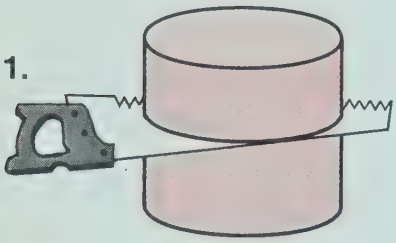
_____

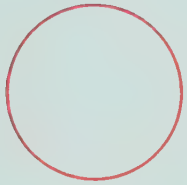
Cross Sections of Cones and Cylinders

The figure below shows a cross section. Think about cutting the figure.

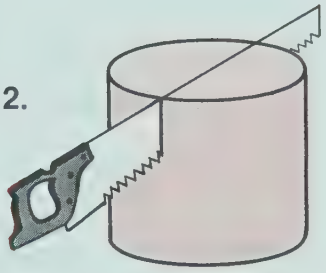


Draw a picture of the cross section for each cut shown below.
Part 1 is an example.

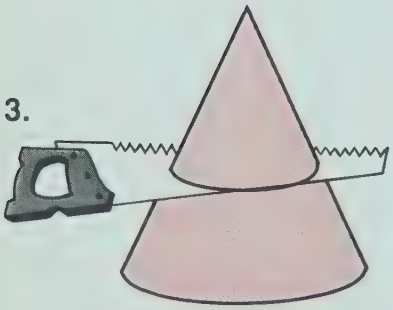
1. 



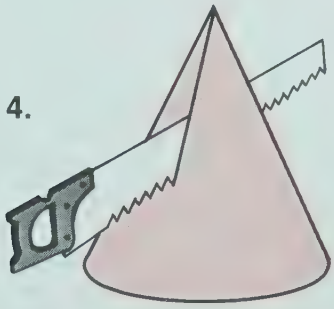
cross section

2. 

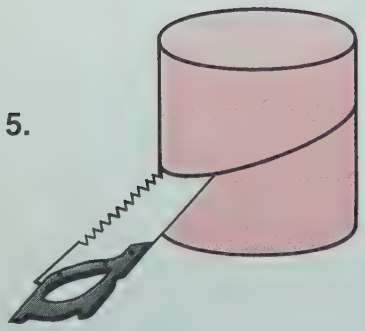
cross section

3. 

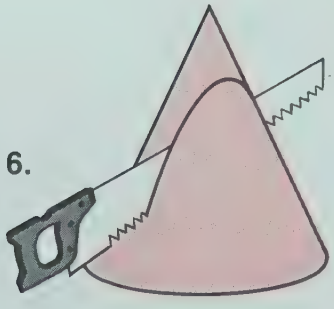
cross section

4. 

cross section

5. 

cross section

6. 

cross section

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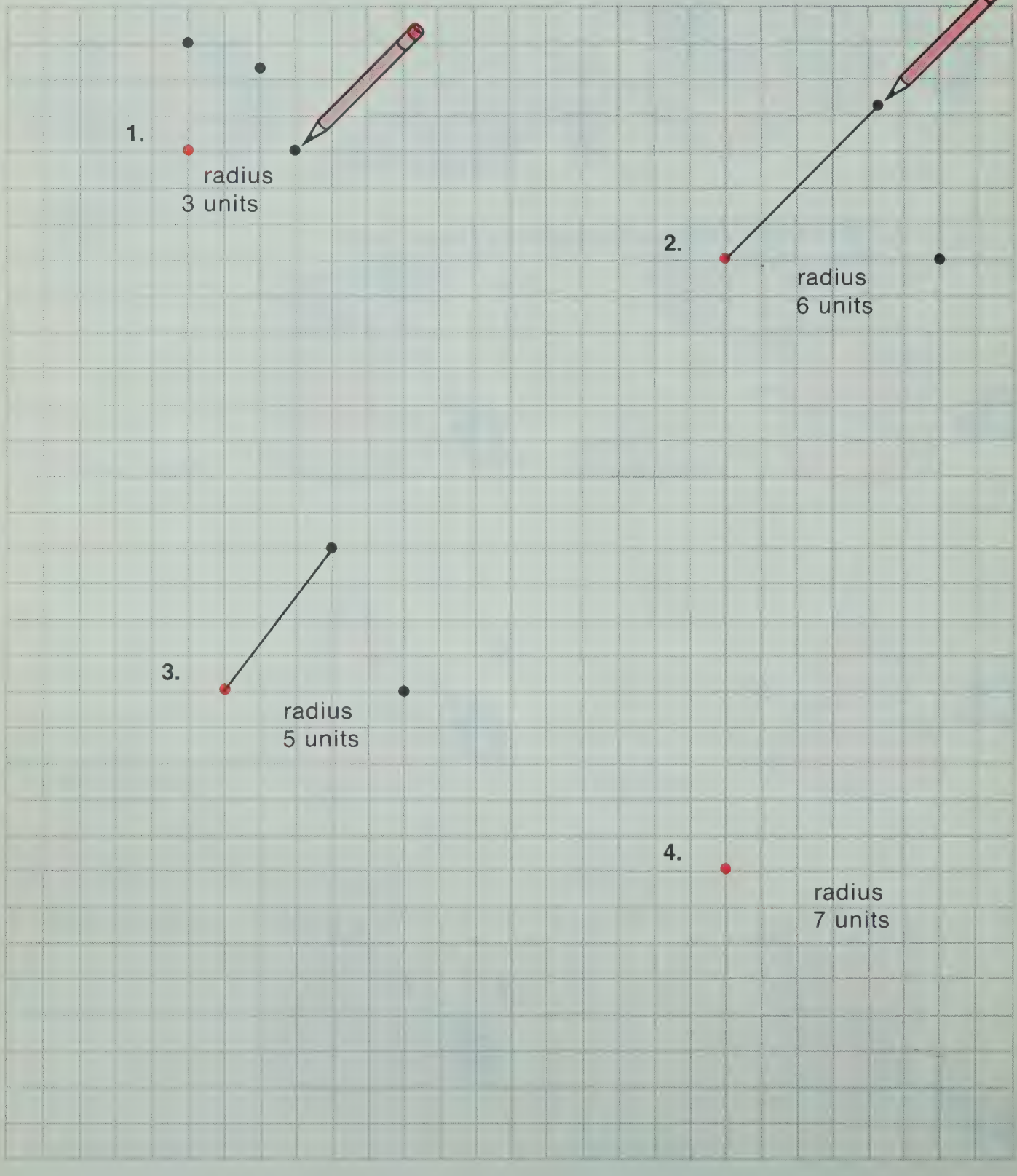
Sketching Circles

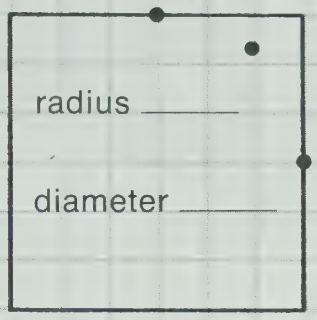
When you **sketch** figures, you use **only** your pencil. Can you find a way to mark points on graph paper to help you **sketch** the circles called for below? The red dots are the centers. The black dots are to help you get started.



Circles and Tangents

Sketch a circle inside each square so the sides of the square are tangent to the circle. Your work on page 56 should help you. Give the radius and diameter of each circle.

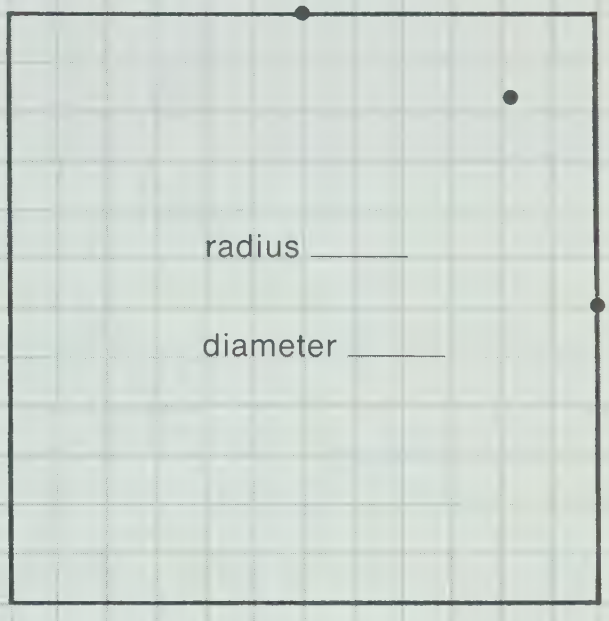
1.



radius _____

diameter _____

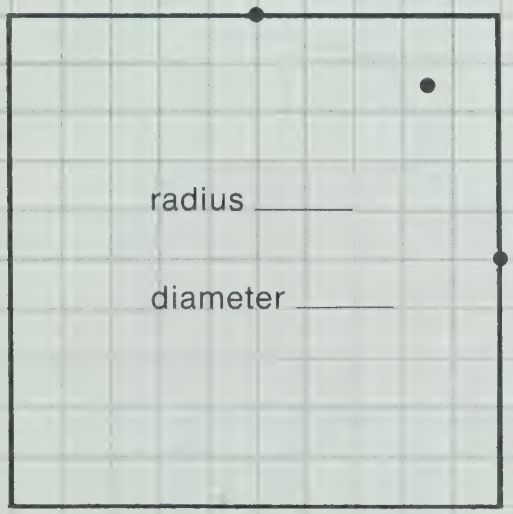
2.



radius _____

diameter _____

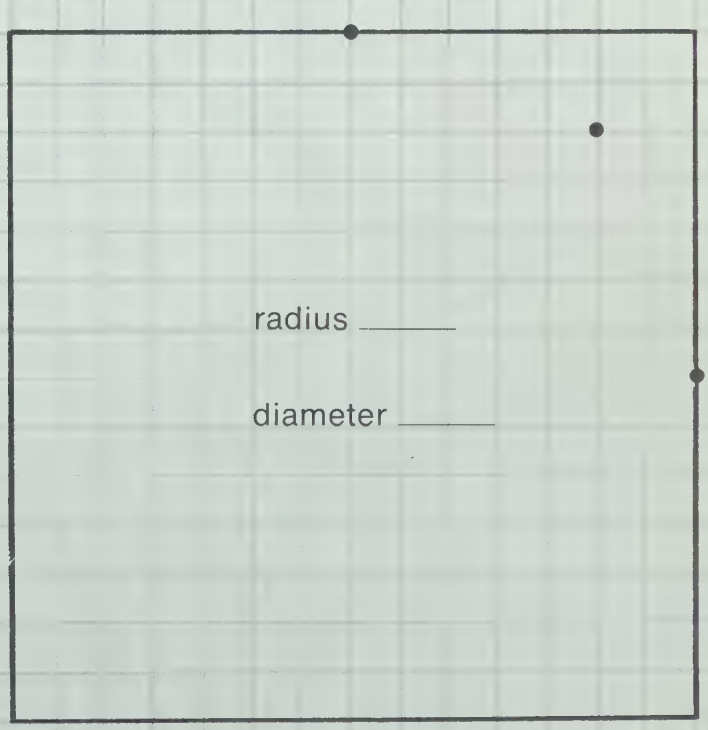
3.



radius _____

diameter _____

4.



radius _____

diameter _____

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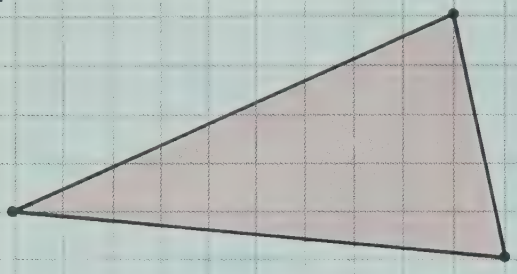
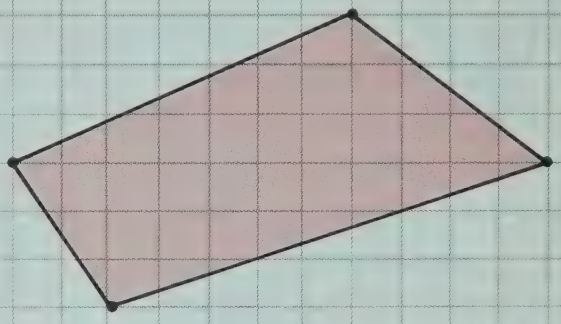
Drawing Congruent Figures

Draw a figure so that it is congruent to the shaded figure.

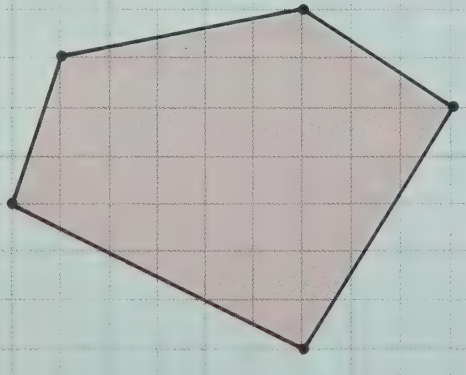
1.



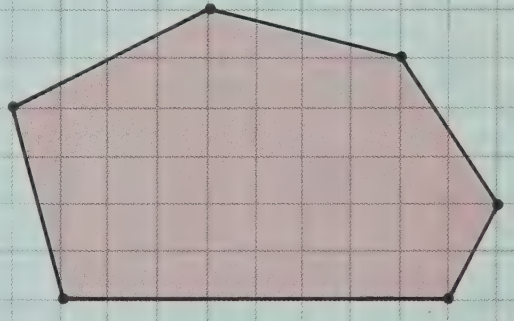
2.



3.

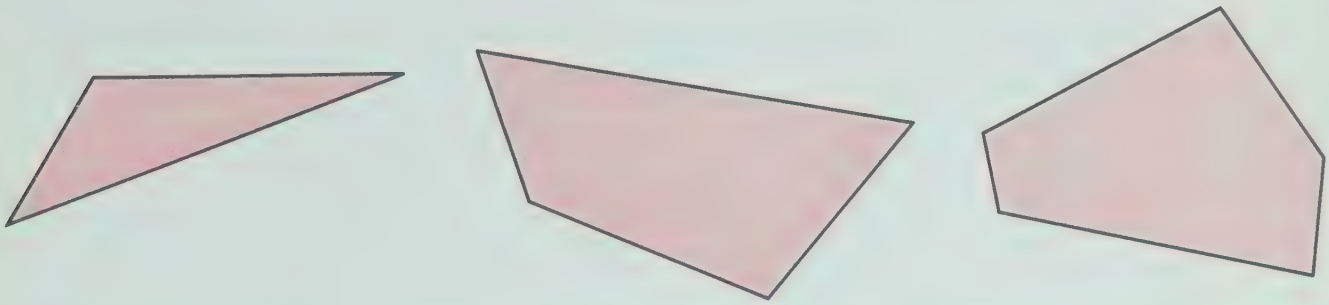


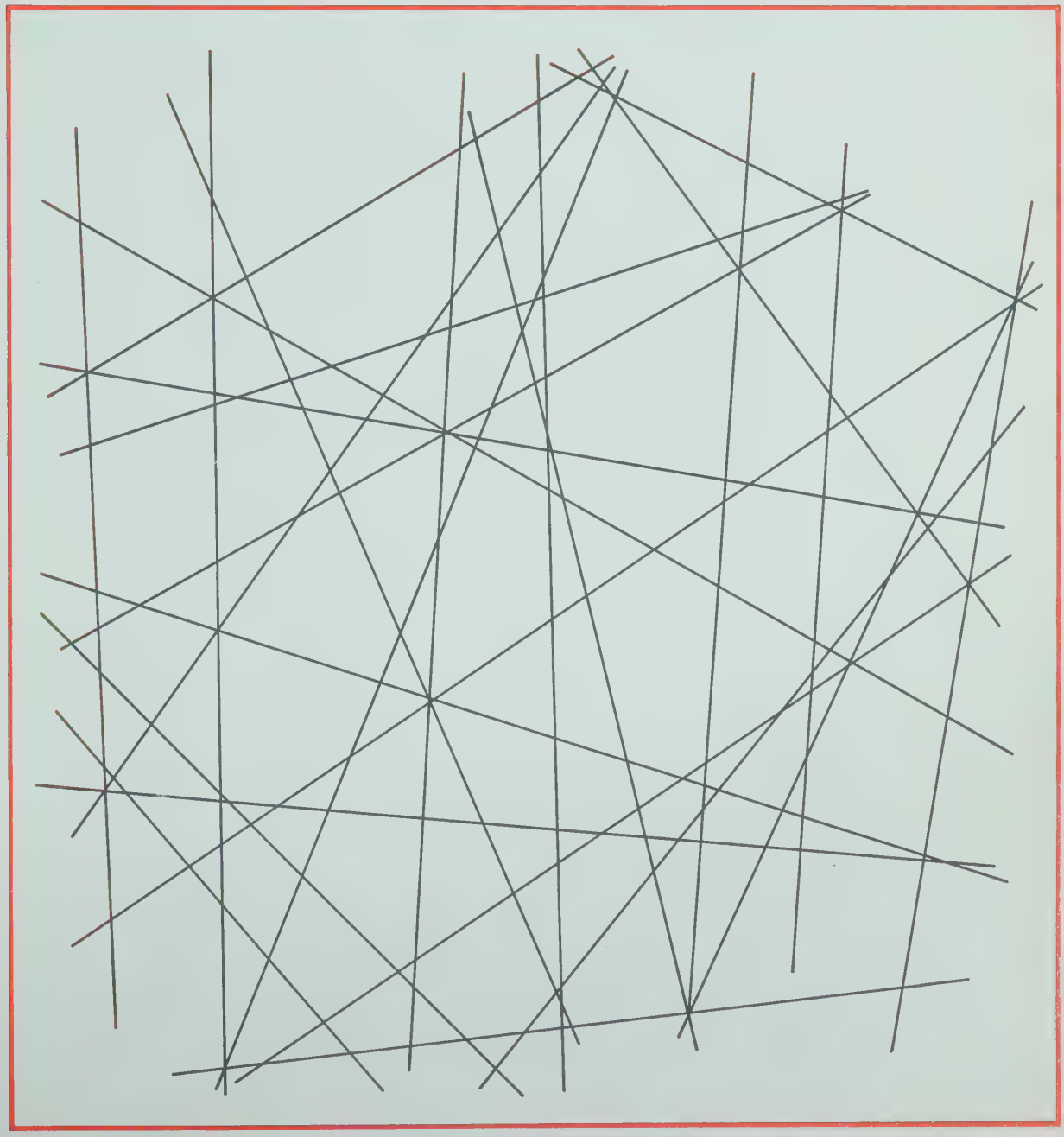
4.



Congruent Figures

There are two figures "hidden" in the box below that are each congruent to the colored figures.
How many can you find and color?





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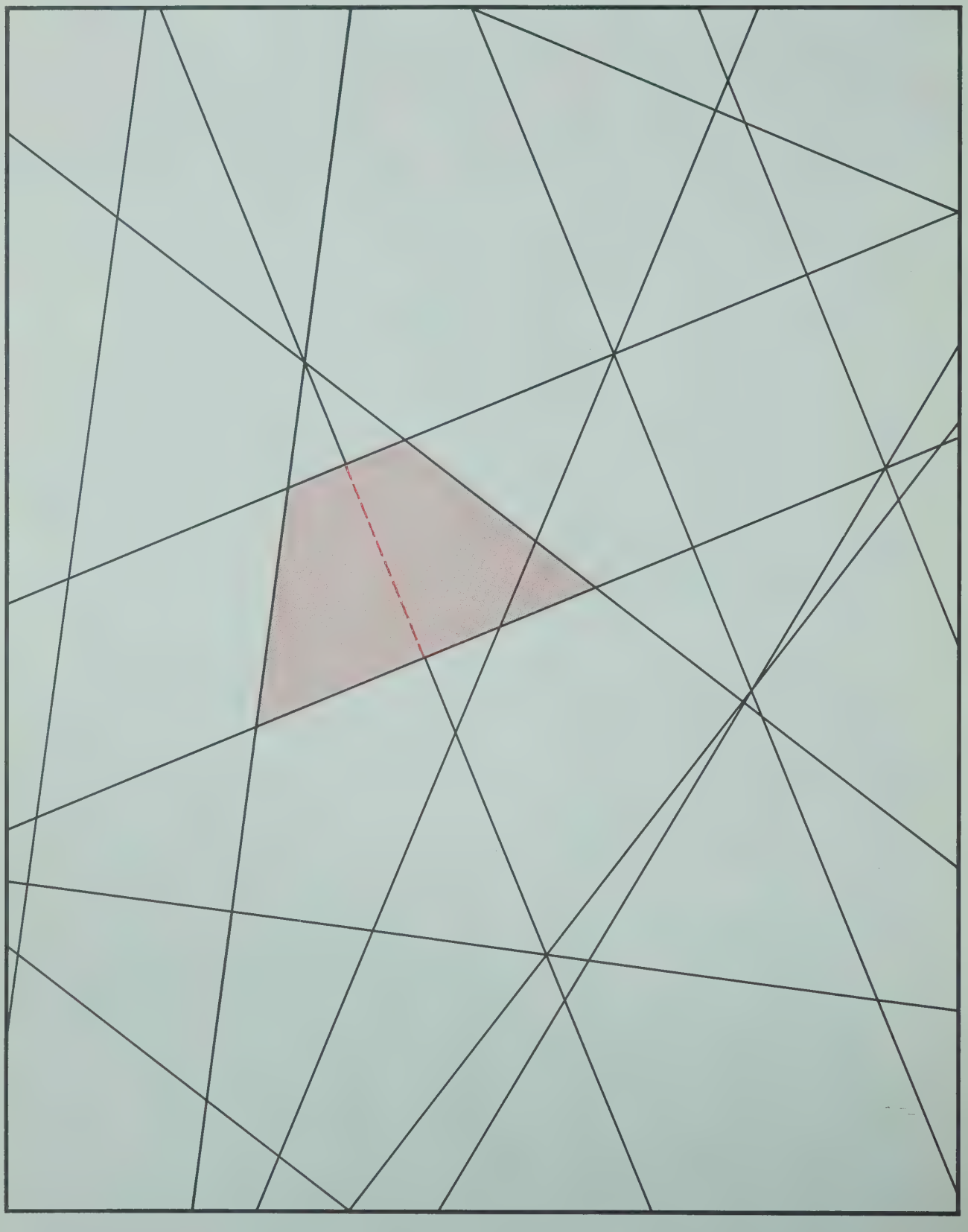
Symmetrical Figures

There are at least 5 symmetrical figures hidden below. See how many you can find. Color them and draw a line of symmetry. One is shown as an example.



Finding Different Remainders

For each divisor make up as many problems as you can that have different remainders. You may not be able to complete all rows.

1. Dividing by 4

4)____ 4)____ 4)____ 4)____ 4)____ 4)____

All different →

2. Dividing by 5

5)____ 5)____ 5)____ 5)____ 5)____ 5)____

3. Dividing by 6

6)____ 6)____ 6)____ 6)____ 6)____ 6)____

4. Dividing by 8

8)____ 8)____ 8)____ 8)____ 8)____

8)____ 8)____ 8)____ 8)____ 8)____

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Estimating Quotients

1. Study each problem. First write your estimate of the quotient in the red box. Then find the correct quotient.

A Estimate _____

$4\overline{)215}$

B Estimate _____

$5\overline{)325}$

C Estimate _____

$8\overline{)370}$

D Estimate _____

$6\overline{)424}$

E Estimate _____

$7\overline{)185}$

F Estimate _____

$3\overline{)164}$

G Estimate _____

$5\overline{)326}$

H Estimate _____

$6\overline{)176}$

I Estimate _____

$7\overline{)528}$

J Estimate _____

$8\overline{)476}$

K Estimate _____

$4\overline{)234}$

L Estimate _____

$9\overline{)375}$

2. Give the remainder for each problem, without finding the quotient.

A $2\overline{)376}$ R = _____

B $2\overline{)587}$ R = _____

C $5\overline{)287}$ R = _____

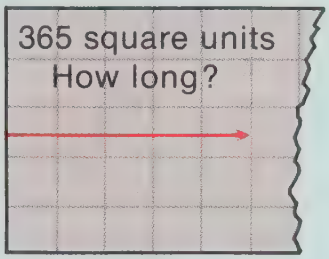
D $5\overline{)615}$ R = _____

E $5\overline{)964}$ R = _____

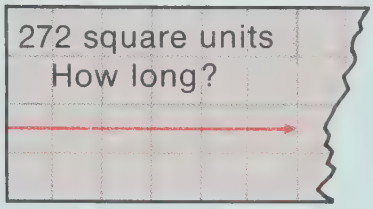
F $5\overline{)339}$ R = _____

Using Estimation In Division

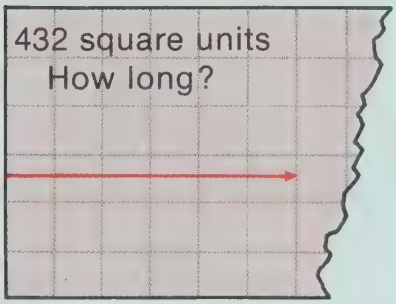
First estimate how long the rectangle would be.
Then use division to find out.

1. 

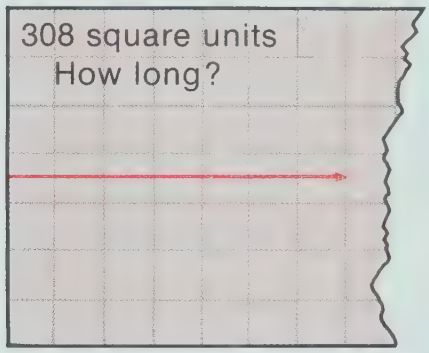
Estimate _____ Actual _____

2. 

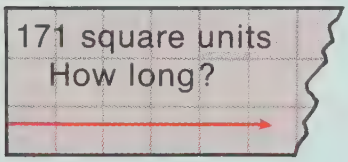
Estimate _____ Actual _____

3. 

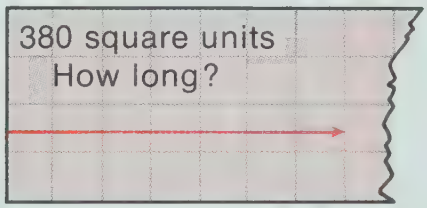
Estimate _____ Actual _____

4. 

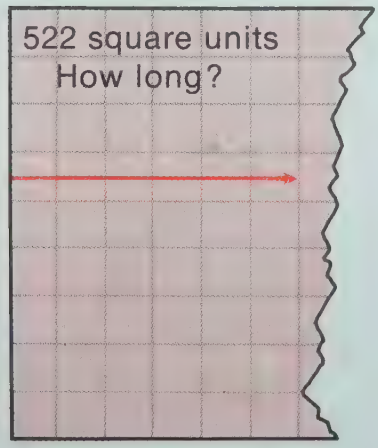
Estimate _____ Actual _____

5. 

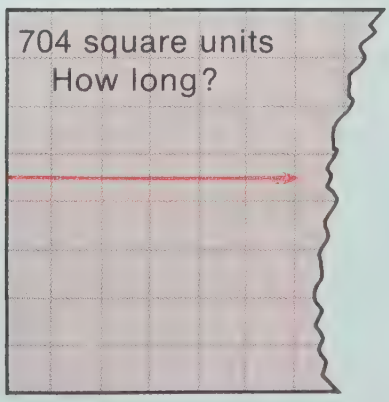
Estimate _____ Actual _____

6. 

Estimate _____ Actual _____

7. 

Estimate _____ Actual _____

8. 

Estimate _____ Actual _____

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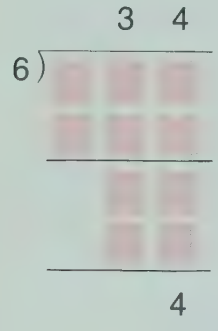
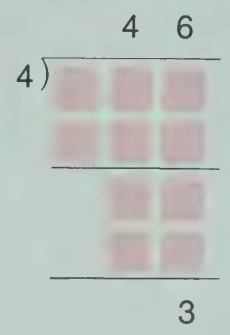
Finding Missing Digits

Find the missing digits. Hint: First find the dividend.

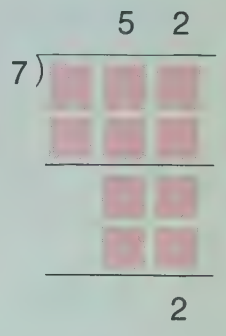
1.



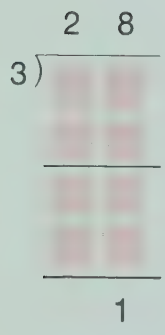
2.



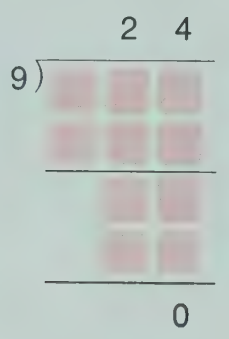
3.



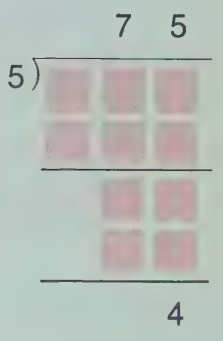
4.



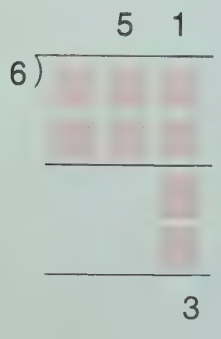
5.



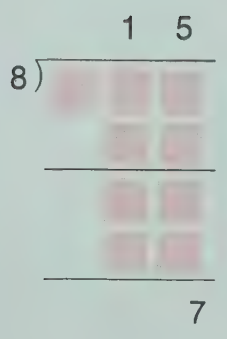
6.



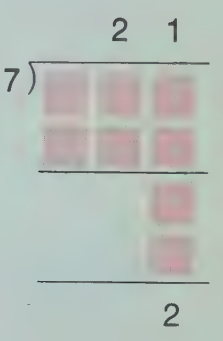
7.



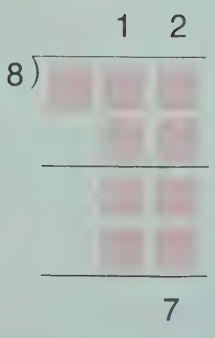
8.



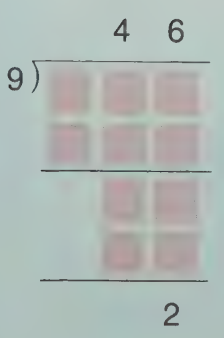
9.



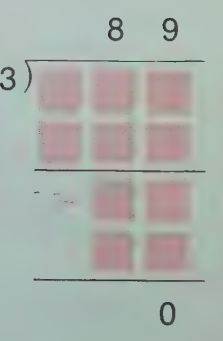
10.



11.

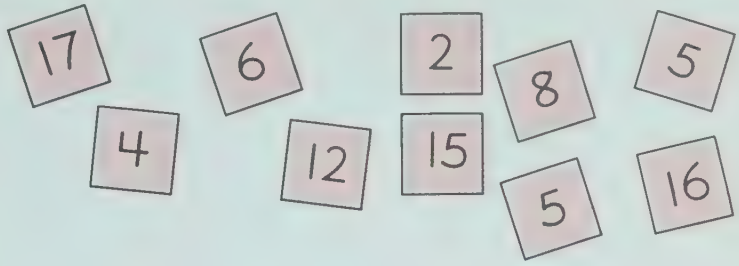


12.



Finding Averages

Use this set of number cards for the problems below. Write your answers on the blank cards.



1. Find 3 cards so the average is 5.

2. Find 4 cards so the average is 13.

3. Find 3 cards so the average is 6.

4. Find 5 cards so the average is 7.

5. Find 4 cards so the average is 12.

6. Find 6 cards so the average is 8.

7. Suppose you had these cards— 6 8 2 What card could you choose so the average of all 4 would be 7.

8. Suppose you had these cards 12 8 6 What 2 cards could you choose so the average of all 5 would be 9.

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3-Digit Quotients

First write your estimate of the quotient in the colored box. Then find the quotient. Next find the difference between your estimate and the quotient. Rate yourself as shown below.

1. $4\overline{)1\ 3\ 8\ 8}$ Estimate

Difference

Score

2. $3\overline{)2\ 5\ 6\ 2}$ Estimate

Difference

Score

3. $5\overline{)3\ 9\ 2\ 0}$ Estimate

Difference

Score

4. $6\overline{)1\ 5\ 9\ 0}$ Estimate

Difference

Score

5. $9\overline{)2\ 9\ 1\ 6}$ Estimate

Difference

Score

6. $7\overline{)4\ 5\ 3\ 6}$ Estimate

Difference

Score

7. $8\overline{)2\ 5\ 5\ 2}$ Estimate

Difference

Score

8. $6\overline{)5\ 5\ 0\ 2}$ Estimate

Difference

Score

9. $5\overline{)4\ 2\ 7\ 5}$ Estimate

Difference

Score

Score each difference as follows:

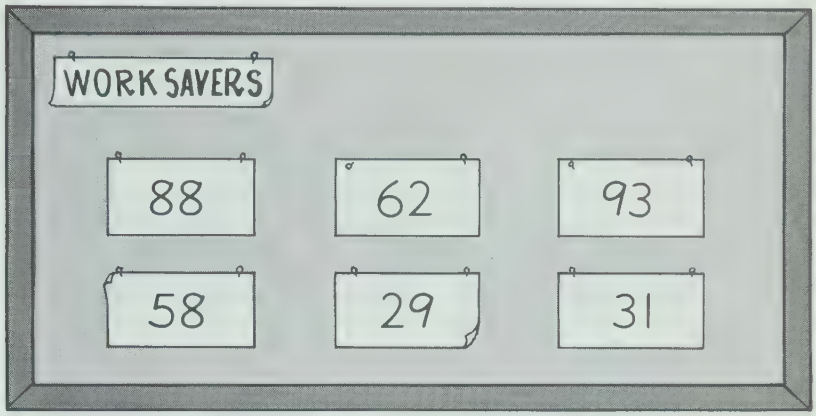
10 or less—5 points
Between 10 and 50—3 points
50 to 100—1 point
over 100—0 points

Add your scores and rate yourself.

35-45	Fantastic
25-34	Excellent
15-24	Good
0-14	Keep trying

Dividing by Multiples of 10

1. Find the quotients. Don't work any harder than you have to. All the answers are on the bulletin board. The remainder may or may not be zero.



A $60\overline{)3500}$ **B** $40\overline{)2497}$ **C** $30\overline{)2640}$ **D** $20\overline{)1770}$

E $50\overline{)1551}$ **F** $40\overline{)2320}$ **G** $20\overline{)1864}$ **H** $70\overline{)2035}$

I $50\overline{)1491}$ **J** $30\overline{)2800}$ **K** $70\overline{)2187}$ **L** $60\overline{)3737}$

2. Make up some problems of your own. The divisor should be a multiple of ten. The quotient is already given.

A $\overline{)\quad 58}$ **B** $\overline{)\quad 39}$ **C** $\overline{)\quad 84}$ **D** $\overline{)\quad 75}$

E $\overline{)\quad 63}$ **F** $\overline{)\quad 71}$ **G** $\overline{)\quad 28}$ **H** $\overline{)\quad 96}$

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Missing Digit Problems

Find the missing digits.

1.

```
      7 7
  )3   6
  3 5 0
  -----
    [illegible]
    3 5
    ---
      1
```

2.

```
      9 [illegible]
  )7 2 [illegible]
  7 2 0
  -----
        9
        8
        -
        1
```

3.

```
      9 9 3
  6)5 9 [illegible] [illegible]
    5 4 0 0
    -------
      [illegible] 6 3
      5 4 0
      -----
        [illegible] [illegible]
        1 8
        ---
          [illegible]
```

4.

```
      [illegible] [illegible] [illegible]
  )2 6 1 5
  2 4 0 0
  -------
    2 1 5
    2 0 0
    -----
      1 5
      1 2
      ---
        3
```

5.

```
      3 [illegible] [illegible]
  7)2 4 9 2
    2 1 0 0
    -------
      [illegible] [illegible] [illegible]
      3 5 0
      -----
        [illegible] [illegible]
        4 2
        ---
          0
```

6.

```
        8 [illegible]
  3 0)[illegible] [illegible] [illegible] [illegible]
    2 4 0 0
    -------
      1 2 [illegible]
      1 2 0
      -----
          5
```

7.

```
        6 5
  [illegible] [illegible])3 0 2 7
    2 7 6 0
    -------
      [illegible] [illegible] [illegible]
      2 3 0
      -----
        3 7
```

8.

```
        [illegible] 3
  7 [illegible])5 2 7 6
    5 0 4 0
    -------
      [illegible] [illegible] [illegible]
      2 1 6
      -----
        2 0
```

9.

```
        6 [illegible]
  3 5)[illegible] [illegible] [illegible] [illegible]
    2 1 0 0
    -------
      [illegible] [illegible] [illegible]
      1 7 5
      -----
          0
```

Special Sets of Numbers

The chart below gives special names we will use on this page for special sets of numbers. Complete the chart. Then complete the tables and statements.

pink	white	gray
0	1	2
3	4	5
6	7	8

+	0	3	6	9
0				
3				
6				
9				

Table 1

×	0	3	6	9
0				
3				
6				
9				

Table 2

+	2	5	8	11
1				
4				
7				
10				

Table 3

×	1	4	7	10
0				
3				
6				
9				

Table 4

1. In Table 1, the sum of a "pink" number and a "pink" number is a _____ number.

2. In Table 2, the product of a "pink" number and a "pink" number is a _____ number.

3. In Table 3, the sum of a "white" number and a "gray" number is a _____ number.

4. In Table 4, the product of a "pink" number and a "white" number is a _____ number.

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Factors and Products

All but two of the numbers below have at least one factor greater than 1 and less than the number itself. Give one or more such factors for each number that has them.

1. 38

Factors _____

2. 39

Factors _____

3. 37

Factors _____

4. 51

Factors _____

5. 85

Factors _____

6. 91

Factors _____

7. 77

Factors _____

8. 78

Factors _____

9. 79

Factors _____

10. 143

Factors _____

11. 119

Factors _____

12. 221

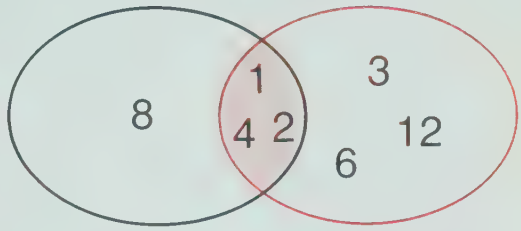
Factors _____

Greatest Common Factor

Study the example below of a **Venn Diagram.** Notice the shaded region is common to both sets. It contains the **common** factors of the two numbers.

The factors of 8: {1, 2, 4, 8}
The factors of 12: {1, 2, 3, 4, 6, 12}

Venn Diagram



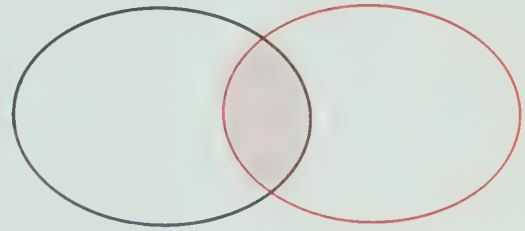
Factors of 8 Factors of 12

List each set of factors. Then put them in the **Venn Diagram.** Give the greatest common factor (GCF) of the 2 numbers.

1. A Factors of 12: _____

B Factors of 18: _____

C The GCF of 12 and 18 is _____.

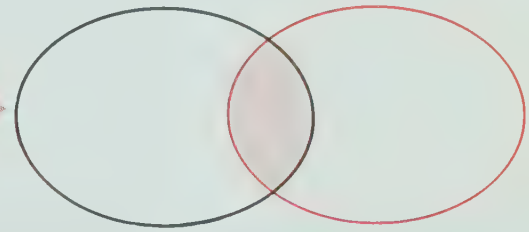


Factors of 12 Factors of 18

2. A Factors of 30: _____

B Factors of 42: _____

C The GCF of 30 and 42 is _____.

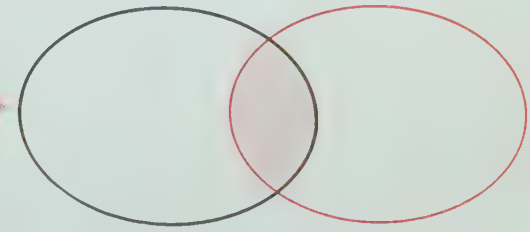


Factors of 30 Factors of 42

3. A Factors of 42: _____

B Factors of 60: _____

C The GCF of 42 and 60 is _____.

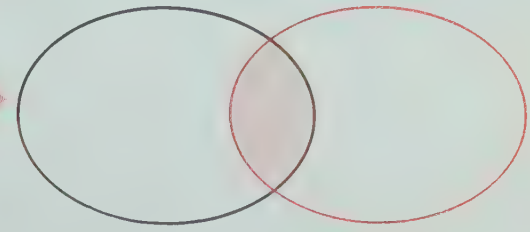


Factors of 42 Factors of 60

4. A Factors of 60: _____

B Factors of 90: _____

C The GCF of 60 and 90 is _____.



Factors of 60 Factors of 90

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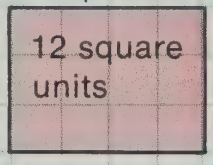
Prime Numbers

1. Draw rectangles (or squares) for each of these areas. (No single rows or columns allowed.) Write the number of units inside the figure.

A 12 square units	**C** 24 square units	**E** 25 square units
B 10 square units	**D** 40 square units	**F** 27 square units

Example for **A**



2. The prime numbers are not areas for rectangles like those above. Draw rectangles for these numbers that are not prime.

A 11 **B** 13 **C** 15 **D** 17 **E** 19 **F** 21 **G** 23

3. Could you use a rectangle to show whether or not 51 is prime?

Number Puzzlers

1. Try these puzzles.

A I'm a very odd teenager. In fact, I'm the only odd teenager who isn't prime. Who am I? _____

B We're the oldest teenage primes. They call us twins because we differ by just 2. Who are we? _____

C We're the only two primes that differ by just 1. We're side-by-side. Who are we? _____

D We're the youngest pair of twins you'll ever find. Remember we're prime and differ by 2. Who are we? _____

2. It is thought that every even number greater than 2 is the sum of two primes. How many pairs of primes can you find below?

4 = 2 + 2	28 = _____ + _____	52 = _____ + _____
6 = 3 + 3	30 = _____ + _____	54 = _____ + _____
8 = 3 + 5	32 = _____ + _____	56 = _____ + _____
10 = _____ + _____	34 = _____ + _____	58 = _____ + _____
12 = _____ + _____	36 = _____ + _____	60 = _____ + _____
14 = _____ + _____	38 = _____ + _____	62 = _____ + _____
16 = _____ + _____	40 = _____ + _____	64 = _____ + _____
18 = _____ + _____	42 = _____ + _____	66 = _____ + _____
20 = _____ + _____	44 = _____ + _____	68 = _____ + _____
22 = _____ + _____	46 = _____ + _____	70 = _____ + _____
24 = _____ + _____	48 = _____ + _____	72 = _____ + _____
26 = _____ + _____	50 = _____ + _____	74 = _____ + _____

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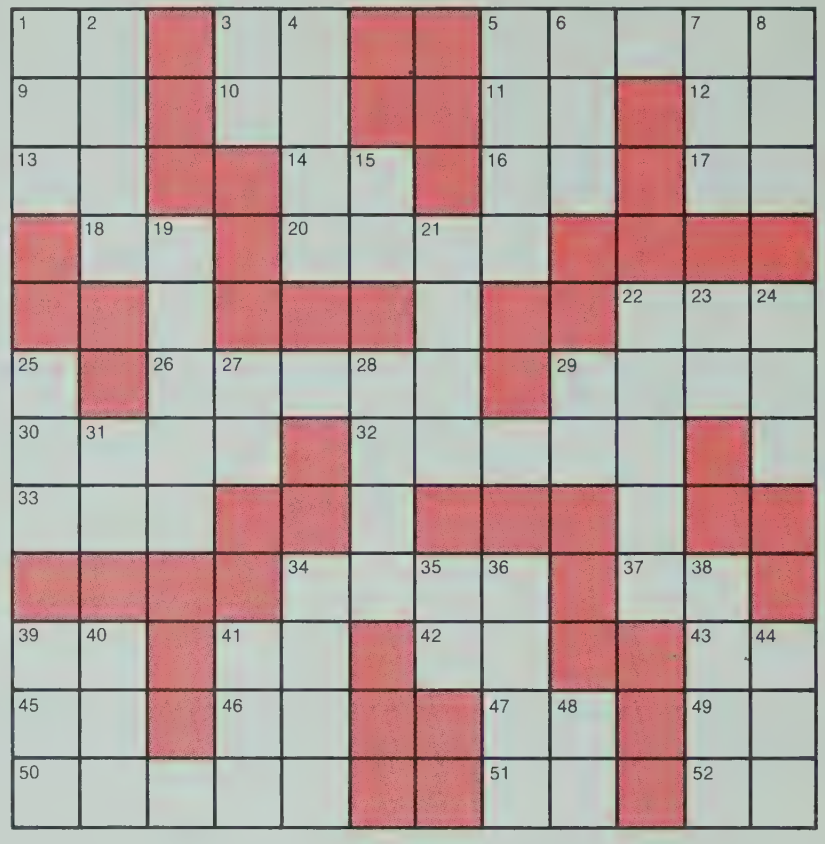
A Number Theory Puzzle



ACROSS

1. First 2-digit multiple of 7

3. Last prime before 41

5. 10,000 + 1000 + 100 + 10 + 1

9. Hundreds and tens places in 2035

10. Factors: 1, 2, 4, 8, 16

11. 6 sixes

12. $10^2 - 10$

13. Smallest 2-digit number

14. One of it's 3 factors is 7

16. First prime < 60

17. Between 29 and it's twin.

18. Smallest 2-digit prime.

20. 6, 7, 5, 7, 4, 7, __, __, __, __.

22. A product of primes, $3 \times 3 \times 7 \times 7$

26. 2, two, II, 2, two

29. First 4 multiples of 3, reverse order.

30. A thousand more than 1135.

32. First 5 even numbers.

33. $10^2 + 94$

34. 1000 more than 48 down.

37. Twin prime with 43.

39. Only prime in the nineties.

41. Greatest common factor of 30 and 40.

42. Smallest teen prime.

43. Twin prime with 11.

45. Prime factors: 7 and 13.

46. Last 2-digit multiple of 10.

47. Prime factors: 5 and 11.

49. Teen number whose only prime factor is 2.

50. Even digits, reverse order.

51. 0, 12, 24, 36, 48, 60, ?

52. Twin prime with 17.

DOWN

1. First 3-digit prime.

2. It's prime factors are 23, 11, and 17.

3. First prime after 29.

4. Largest number with 3, 4, 6, and 7.

5. First 4 odd numbers.

6. One of it's 3 factors is 13.

7. $(2 \times 10^2) - 7$

8. Smallest 3-digit number.

15. Largest 2-digit prime.

19. Smallest number with the digits 0, 1, 2, 3, 4.

21. Smallest prime in all 4 places.

22. fourty-six thousand, eight hundred four.

23. Twin prime with 41.

24. Prime factors: 2, 2, 5, 5.

25. One of it's 3 factors is 11.

27. One of it's 3 factors is 5.

28. Prime factors: 2, 2, 2, 2, 5, 5, 5.

29. 3 thirty-twos

31. Largest teen prime.

34. Smallest 4-digit number.

35. Prime factors: 3 and 17.

36. First 4 primes.

38. 11 hundreds and 11.

39. 1000 − smallest prime.

40. One minute past quarter after 7.

41. $200 - (2 \times 2 \times 2)$

44. 0, __, __, __, 12, 15, 18, 21.

48. $13 \times 2 \times 2$

Fractional Parts of An Hour

There are 60 minutes in an hour. Color the fractional part of the clock (1 hour) indicated by the number of minutes. Then give the fraction to tell what part you shaded.

EXAMPLE:

15 minutes

Part of an hour. $\frac{1}{4}$

1.

30 minutes

Part of an hour. _____

2.

45 minutes

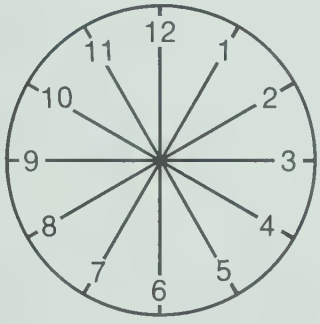
Part of an hour. _____

3.

10 minutes

Part of an hour. _____

4.



20 minutes

Part of an hour. _____

5.

50 minutes

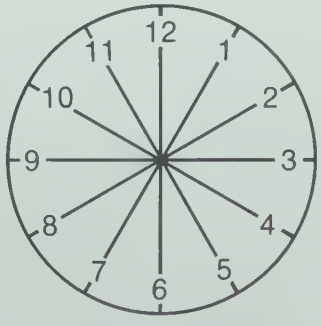
Part of an hour. _____

6.

5 minutes

Part of an hour. _____

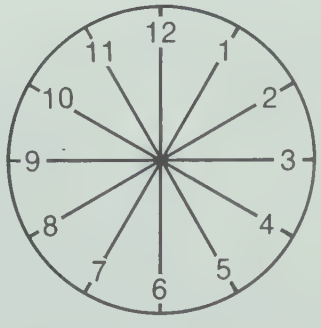
7.



25 minutes

Part of an hour. _____

8.



60 minutes

Part of an hour. _____

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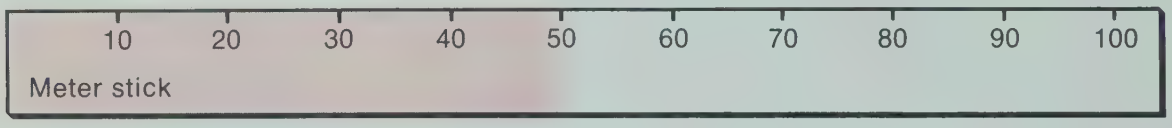
Fractional Parts of a Meter

There are 100 centimeters in a meter. Think of the rulers below as meter sticks reduced in size. Shade the given fractional part. Then answer the questions.

EXAMPLE:

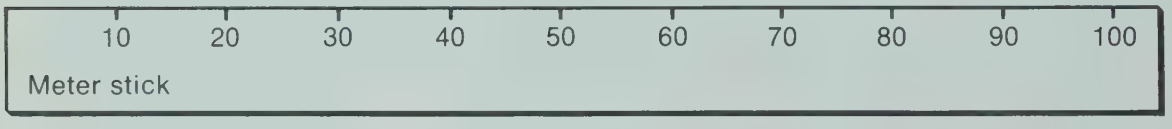


Shade $\frac{1}{2}$

How many centimeters did you shade? 50

What fractional part (in hundredths) did you shade? $\frac{50}{100}$

1.

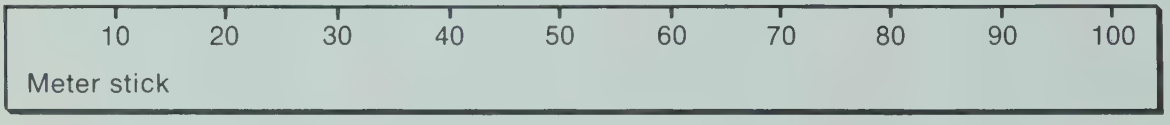


Shade $\frac{1}{4}$

How many centimeters did you shade? _____

What fractional part (in hundredths) did you shade? _____

2.

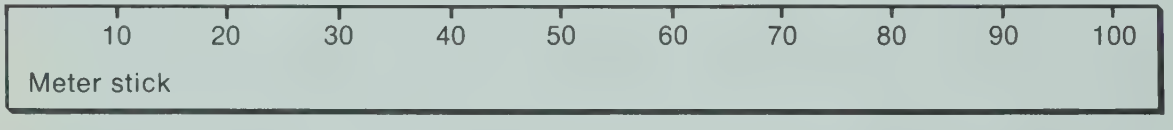


Shade $\frac{3}{4}$

How many centimeters did you shade? _____

What fractional part (in hundredths) did you shade? _____

3.

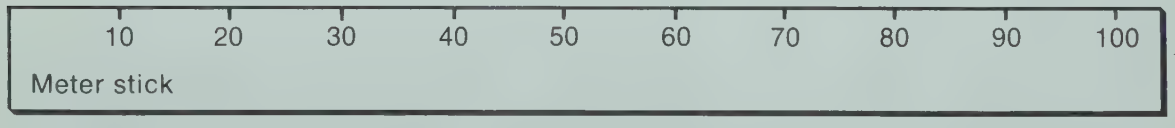


Shade $\frac{1}{10}$

How many centimeters did you shade? _____

What fractional part (in hundredths) did you shade? _____

4.

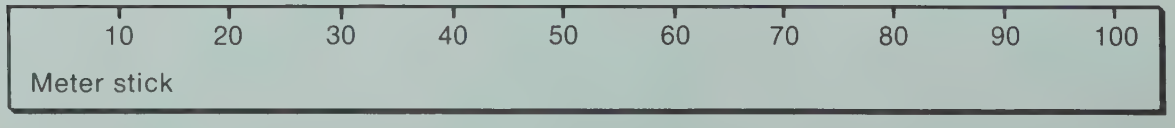


Shade $\frac{1}{5}$

How many centimeters did you shade? _____

What fractional part (in hundredths) did you shade? _____

5.



Shade $\frac{3}{5}$

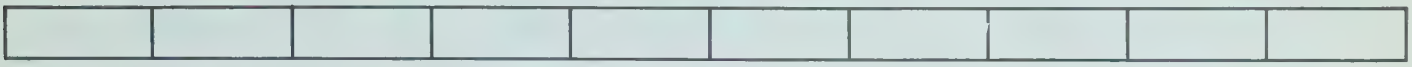
How many centimeters did you shade? _____

What fractional part (in hundredths) did you shade? _____

Finding Missing Fractions

Give the missing fractions. Then color a fractional part of the rod for the set of equivalent fractions. The rod is divided into 10ths to help you color.

1. ____, ____, ____, ____, ____, ____, $\frac{7}{28}$, $\frac{8}{32}$, $\frac{9}{36}$, ____, . . .



2. ____, ____, ____, ____, ____, $\frac{18}{30}$, $\frac{21}{35}$, $\frac{24}{40}$, ____, ____, . . .

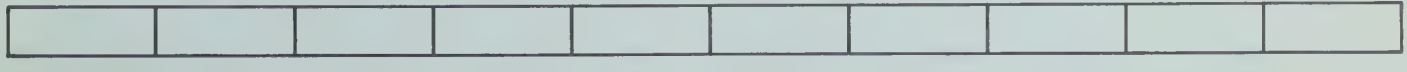
3. ____, ____, ____, ____, ____, ____, ____, $\frac{24}{32}$, $\frac{27}{36}$, $\frac{30}{40}$, . . .

4. ____, ____, ____, ____, $\frac{25}{40}$, $\frac{30}{48}$, $\frac{35}{56}$, ____, ____, ____, . . .

5. ____, ____, ____, ____, ____, ____, ____, $\frac{56}{80}$, $\frac{63}{90}$, $\frac{70}{100}$, . . .

6. ____, ____, ____, ____, ____, $\frac{12}{18}$, $\frac{14}{21}$, $\frac{16}{24}$, ____, ____, . . .

7. ____, ____, ____, ____, ____, ____, ____, ____, $\frac{9}{18}$, ____, . . .



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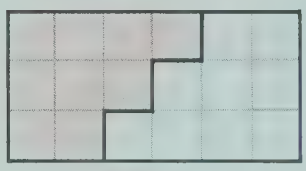
Tenths and Hundredths

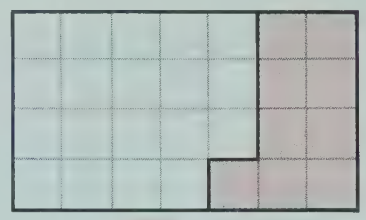
1. Much of your work with fractions will use tenths and hundredths. Estimate the numerator of each fraction.

A



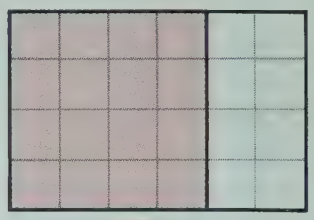
About $\frac{\quad}{10}$ is shaded.

B



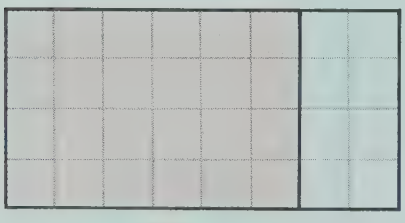
About $\frac{\quad}{10}$ is shaded.

C



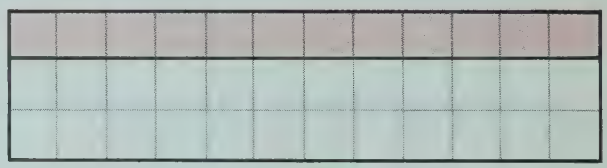
About $\frac{\quad}{10}$ is shaded.

D



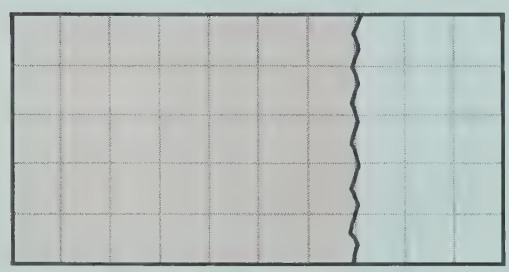
About $\frac{\quad}{100}$ is shaded.

E



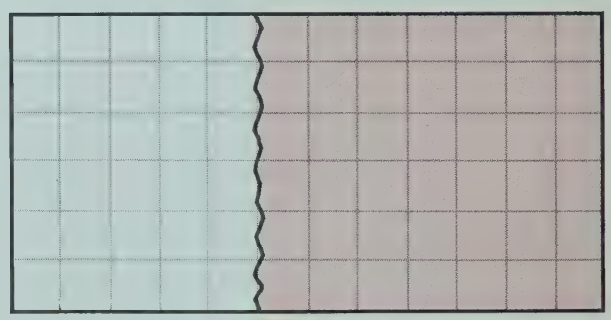
About $\frac{\quad}{100}$ is shaded.

F



About $\frac{\quad}{100}$ is shaded.

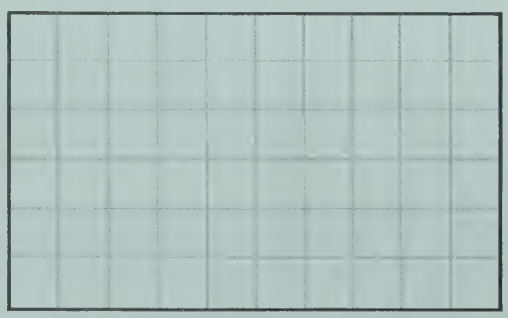
G



About $\frac{\quad}{100}$ is shaded.

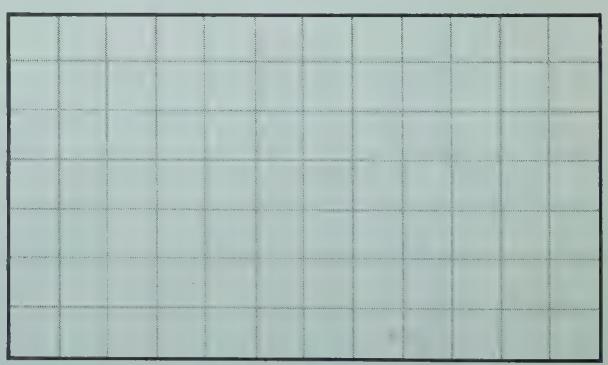
2. Shade the given amount as close as you can.

A



Shade about $\frac{4}{10}$.

B



Shade about $\frac{75}{100}$.

Using Improper Fractions

The unit for the ruler below is the decimeter (10 centimeters).
See if you can draw the figures suggested.

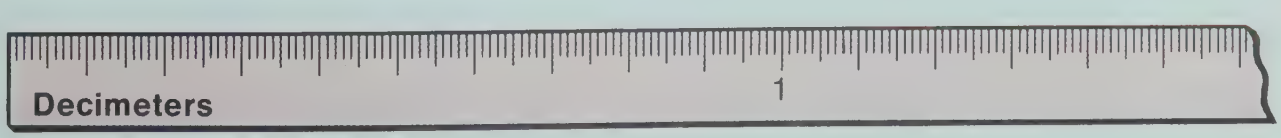
1. Draw a pencil that is $\frac{12}{10}$ decimeters long.

2. Draw a ball point pen that is $\frac{13}{10}$ decimeters long.

3. Draw an ice cream stick that is $\frac{3}{2}$ decimeters long.

4. Draw a drinking straw that is $\frac{110}{100}$ decimeters long.

5. Draw a tooth brush that is $\frac{6}{5}$ decimeters long.



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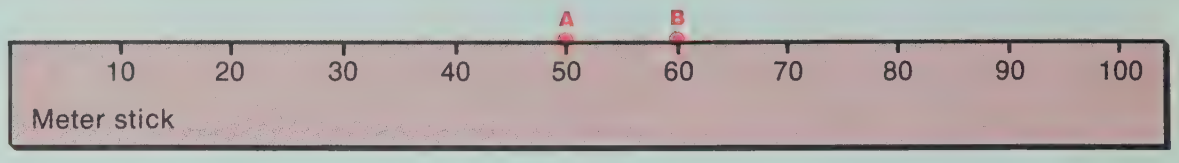
Exploring Fractions that are not Equivalent

Can you find a way to mark points on the meter stick for each length.
After you do, ring the greater length.

EXAMPLE:

A $\frac{1}{2}$ meter

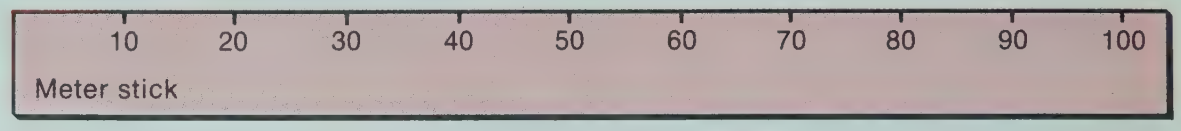
B $\frac{6}{10}$ meter



1.

A $\frac{1}{4}$ meter

B $\frac{3}{10}$ meter



2.

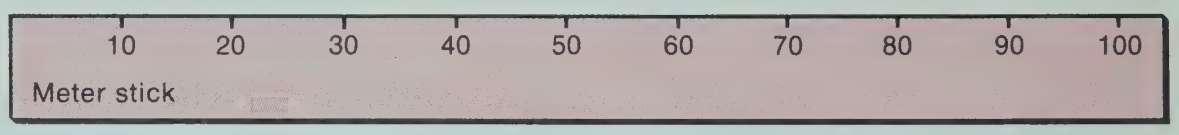
A $\frac{7}{10}$ meter

B $\frac{3}{4}$ meter

3.

A $\frac{2}{5}$ meter

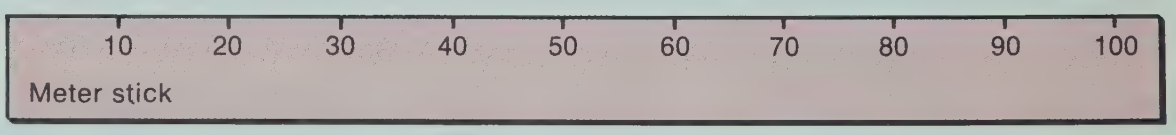
B $\frac{3}{10}$ meter



4.

A $\frac{3}{4}$ meter

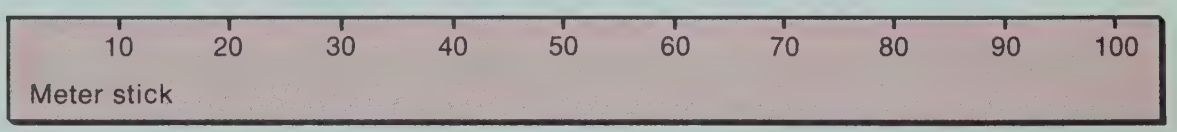
B $\frac{8}{10}$ meter



5.

A $\frac{3}{4}$ meter

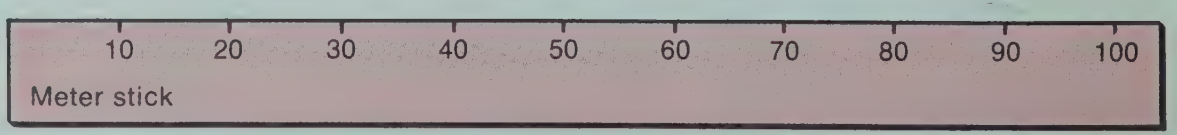
B $\frac{2}{3}$ meter



6.

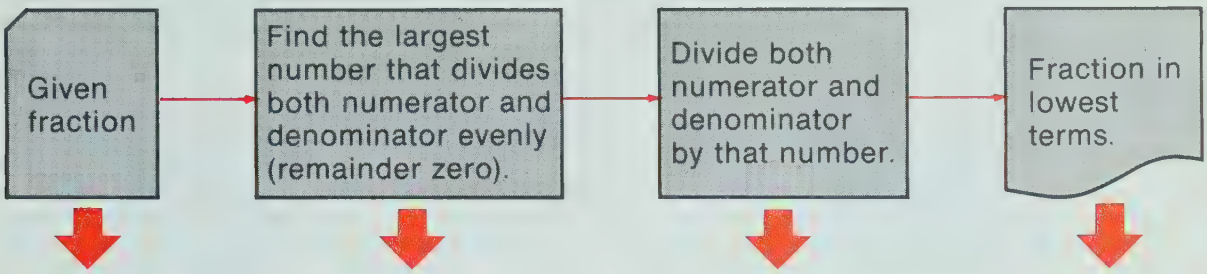
A $\frac{2}{3}$ meter

B $\frac{5}{8}$ meter



Finding Lowest-terms Fractions

1. The flow chart below shows how to find a lowest-terms fraction that is equivalent to the given fraction.



EXAMPLE: $\frac{12}{18}$ → 6 → $\frac{12 \div 6}{18 \div 6}$ → $\frac{2}{3}$

A Now you try one. $\frac{12}{20}$ → ____ → ____ → ____

If you did the work correctly the lowest-terms fraction should be $\frac{3}{5}$.

B Try another. $\frac{10}{16}$ → ____ → ____ → ____

This time you should get $\frac{5}{8}$.

2. Now find the lowest-terms fraction for each of these fractions. The answers are in the answer box.

A $\frac{6}{8}$

B $\frac{8}{12}$

C $\frac{9}{18}$

D $\frac{21}{30}$

E $\frac{12}{32}$

F $\frac{5}{15}$

G $\frac{6}{24}$

H $\frac{24}{30}$

ANSWER BOX

ANSWER BOX

$\frac{4}{5}$ $\frac{2}{3}$ $\frac{3}{8}$ $\frac{1}{2}$ $\frac{1}{4}$ $\frac{1}{3}$ $\frac{3}{4}$ $\frac{7}{10}$

ANSWER BOX

ANSWER BOX

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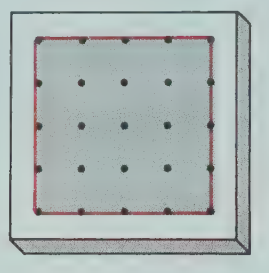
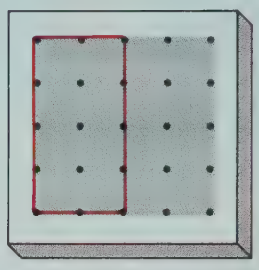
Fractions and Area

1. Think of the figures below as boards with 25 nails driven in part way. Think of the colored outlines as rubber bands around the nails.

If this rubber band encloses an area of 1,

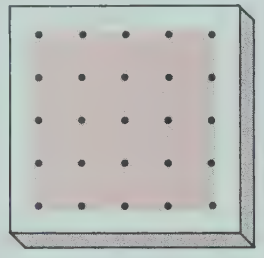


what area does this rubber band enclose?

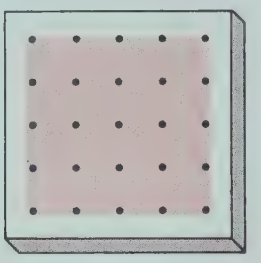


2. Think of the shaded part as having area 1. Show an area on the nail board for each fraction.

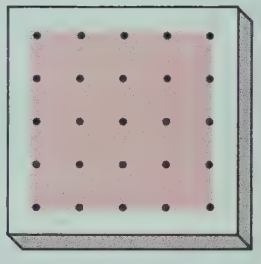
A $\frac{1}{4}$



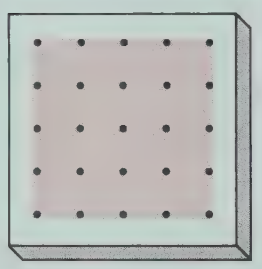
B $\frac{1}{8}$



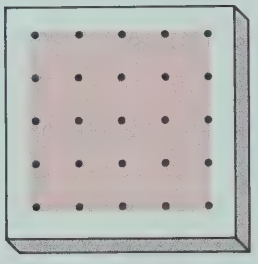
C $\frac{1}{16}$



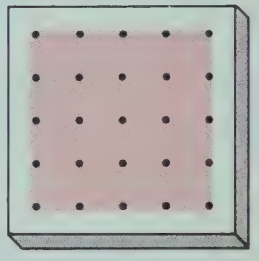
D $\frac{3}{4}$



E $\frac{5}{8}$

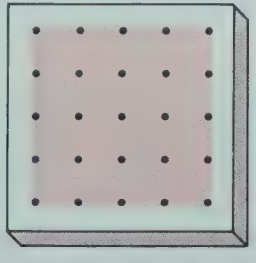


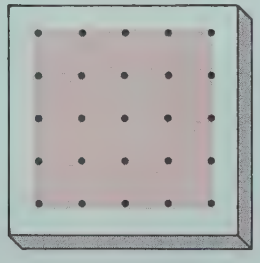
F $\frac{7}{16}$



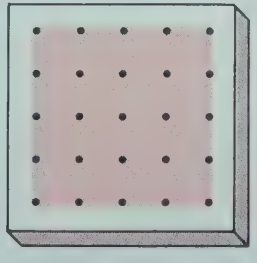
3. Show each fraction with as many different shaped regions as you can. You may want to use the "extra" nailboards to show your answers.

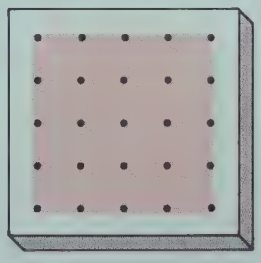
A $\frac{1}{4}$



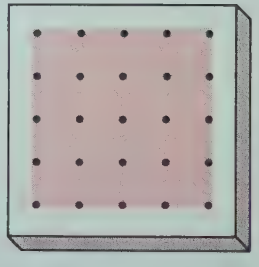


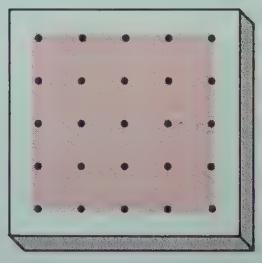
B $\frac{1}{8}$





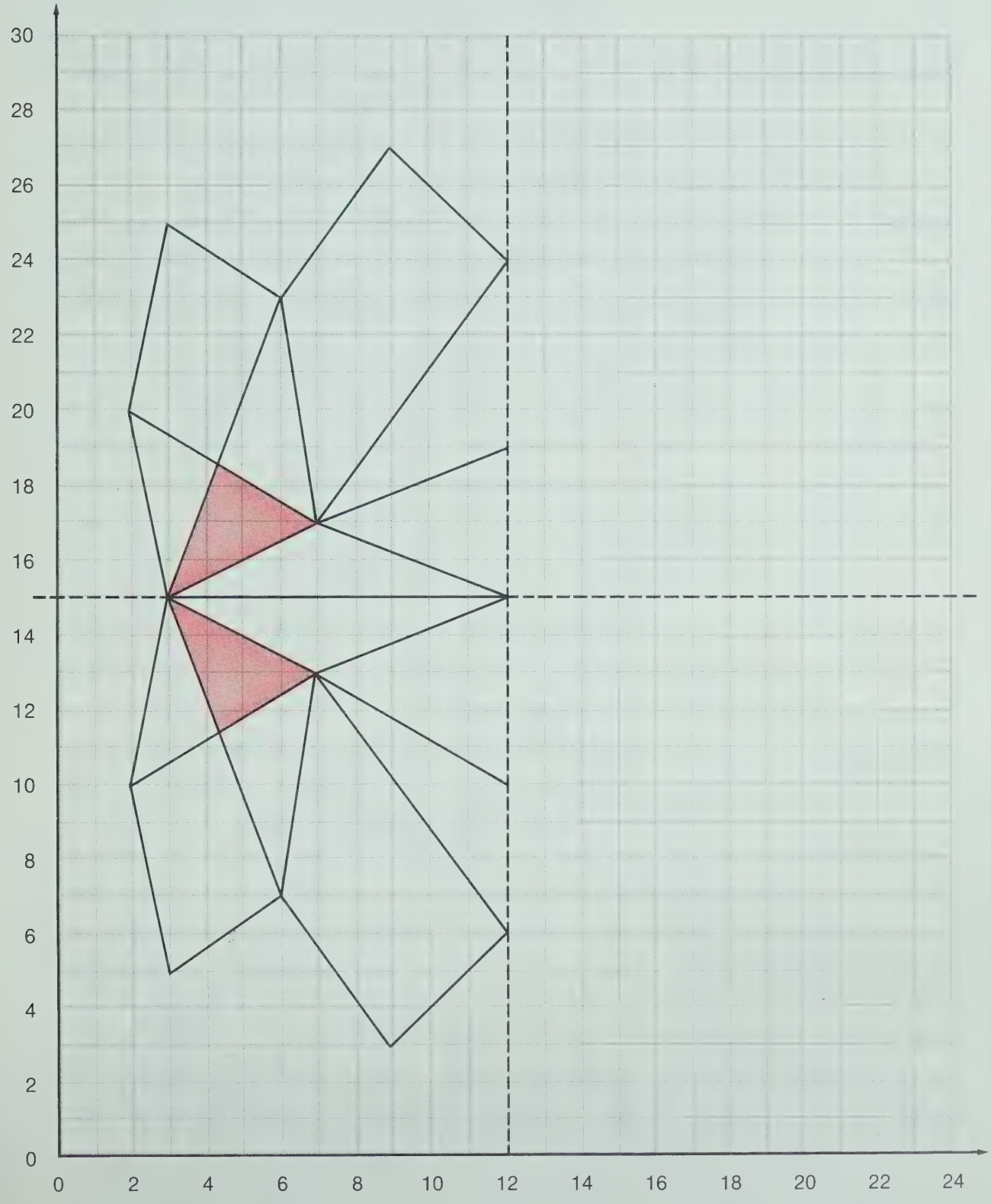
C $\frac{1}{16}$





Symmetrical Designs

Use coordinates to help you draw the other half of this symmetrical design. Can you complete coloring the design so it can be folded along either dashed line and the colors will "match."



Try making a symmetrical design of your own on another sheet of graph paper

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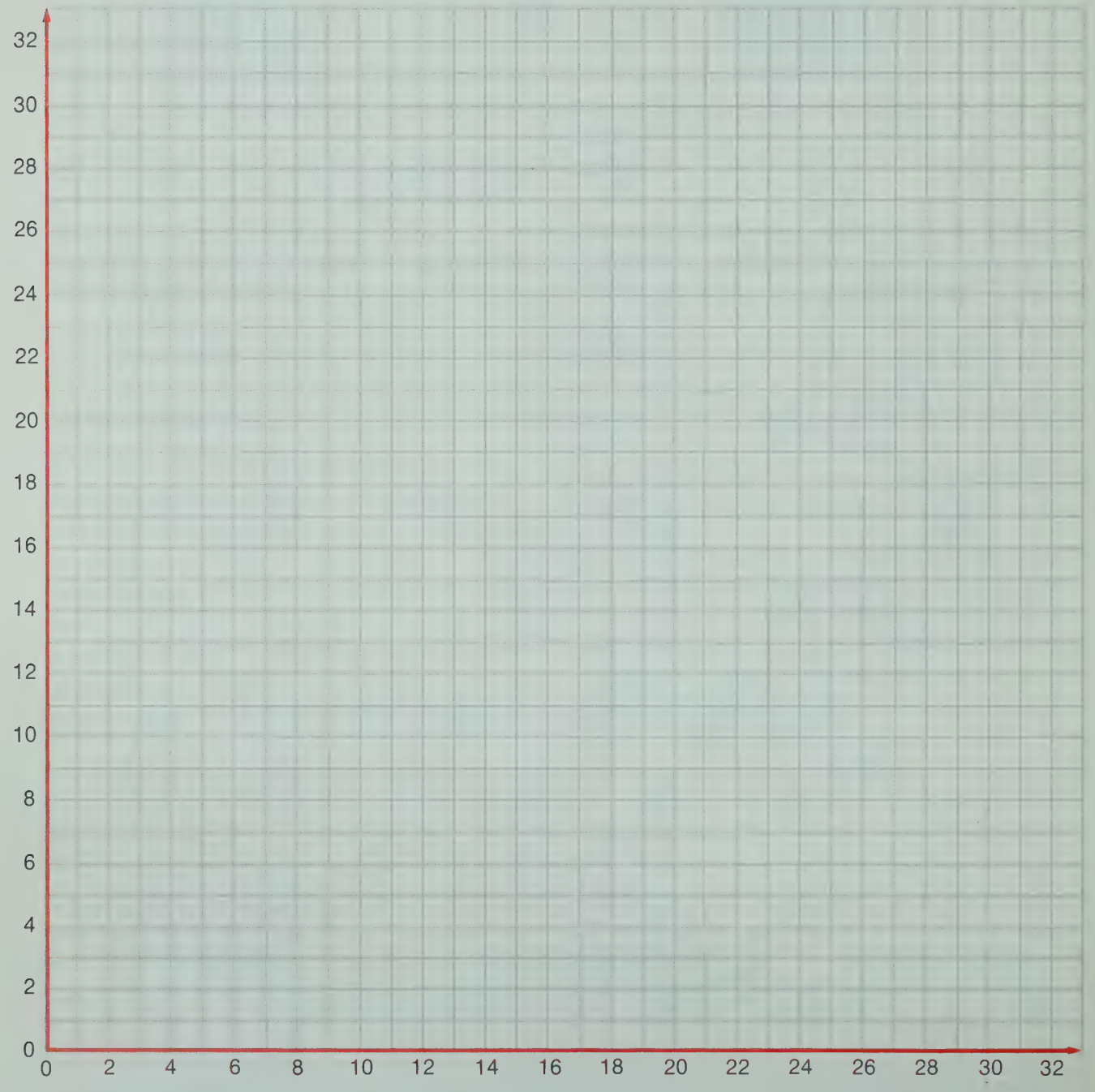
Using Coordinates to Sketch Circles

Use the "coordinate clues" below to help you sketch two circles.
Remember, circles are symmetrical figures.

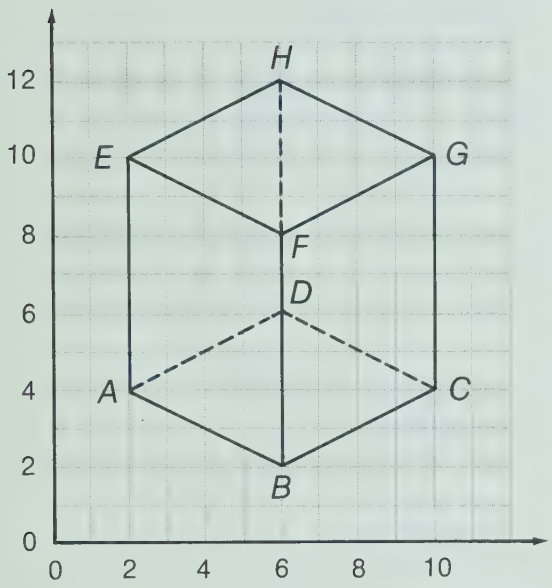
	First Circle		Second Circle
Clue 1	Center: (12, 12)	Clue 1	Center: (12, 23)
Clue 2	Radius: 10	Clue 2	Radius: 8
Clue 3	Passes through (18, 4) and (20, 6)	Clue 3	Passes through (approximate): (5, 27) and (8, 30)



If you made your sketches carefully, the two circles should intersect at about (5, 19) and (19, 19).

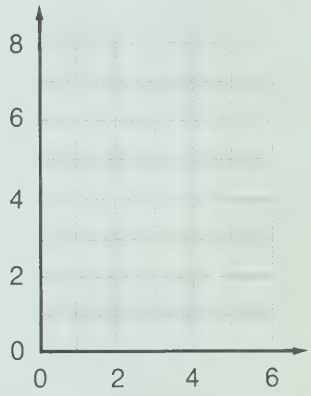
Stretching and Shrinking with Coordinates

Give the coordinates for the vertices on the cube and pyramid. Divide all the cube coordinates by 2 to get a new set of coordinates. Double the coordinates of the pyramid. Graph the new sets and connect the points to get a smaller cube and larger pyramid.

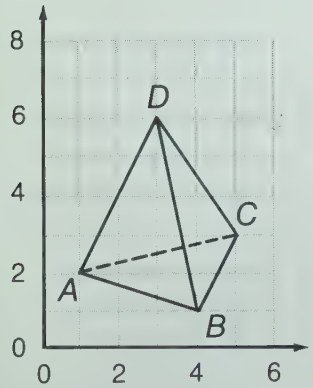


Cube coordinates		half
A: (2, 4)	→	(1, 2)
B: (6, 2)	→	(3, 1)
C: (10, 4)	→	(,)
D: (,)	→	(,)
E: (,)	→	(,)
F: (,)	→	(,)
G: (,)	→	(,)
H: (,)	→	(,)

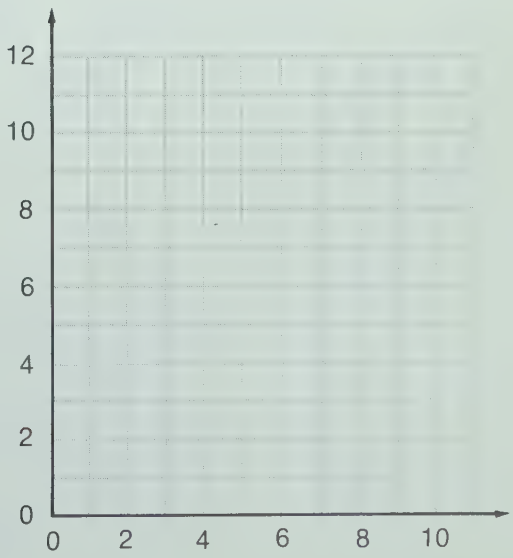
Smaller Cube



Larger Pyramid



Pyramid coordinates		double
A: (,)	→	(,)
B: (,)	→	(,)
C: (,)	→	(,)
D: (,)	→	(,)



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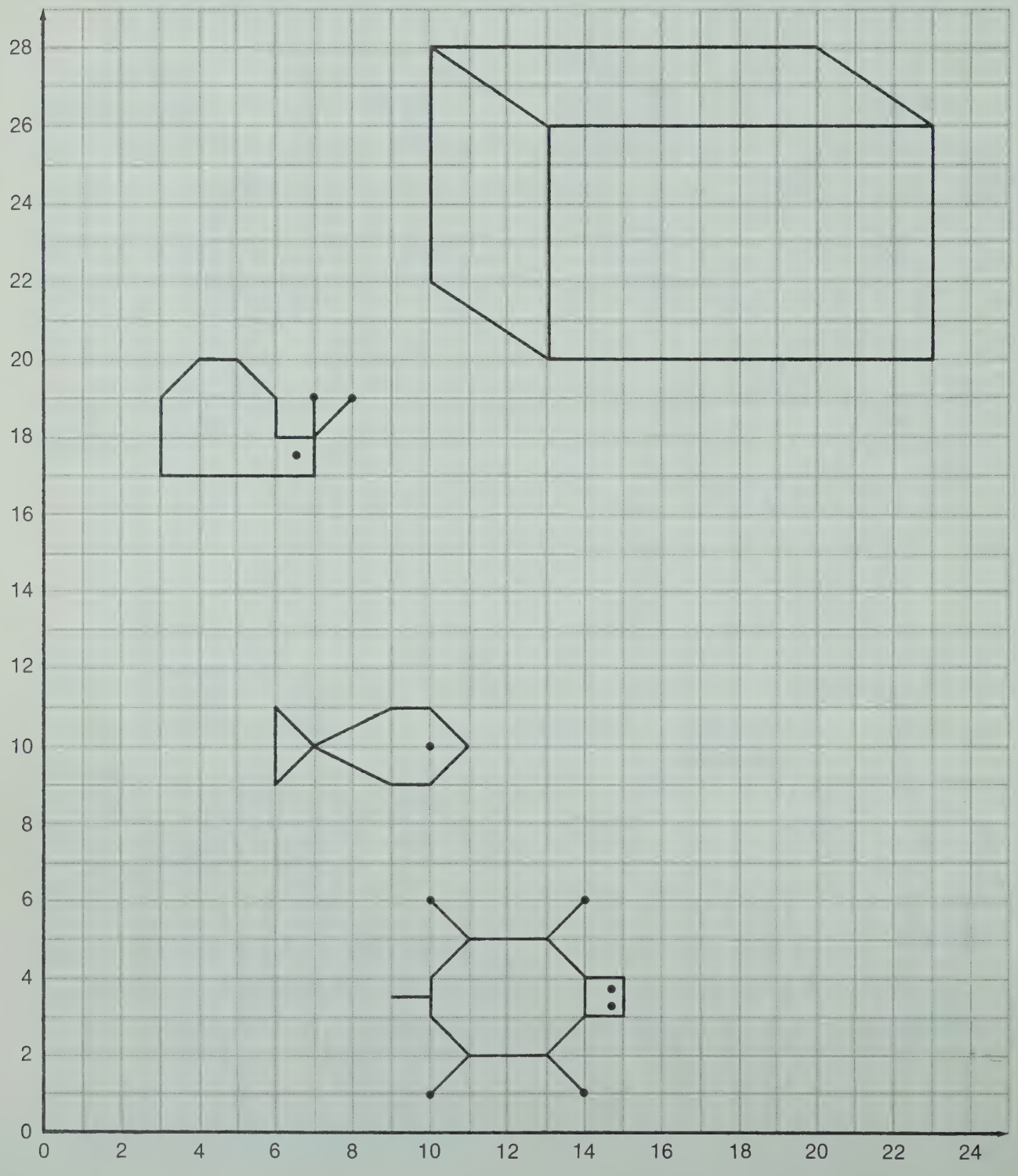
Moving Figures

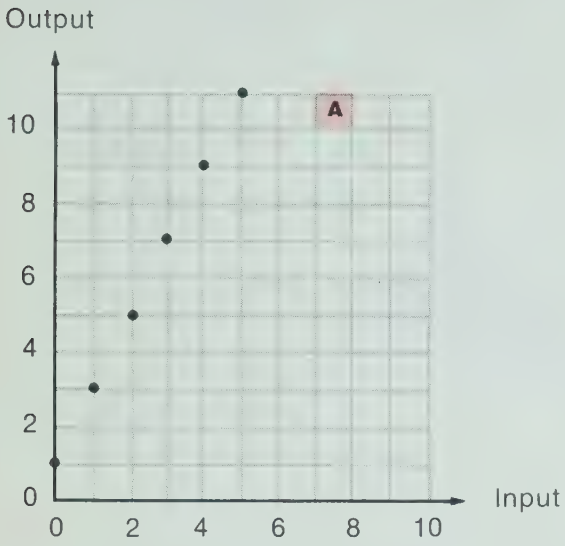
First, tell what moves you would make to put the fish, snail, and turtle in the tank. Then put them in the tank.

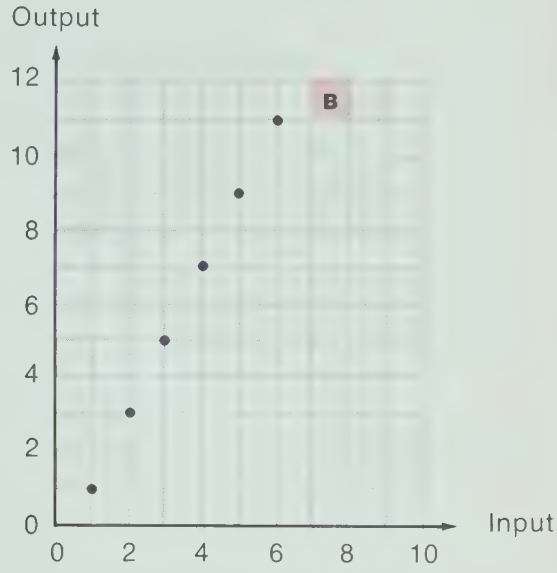
Moves
- Fish _____
- Snail _____
- Turtle _____

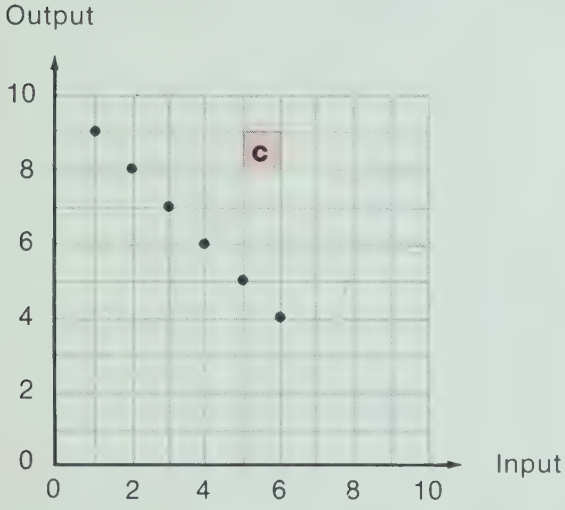


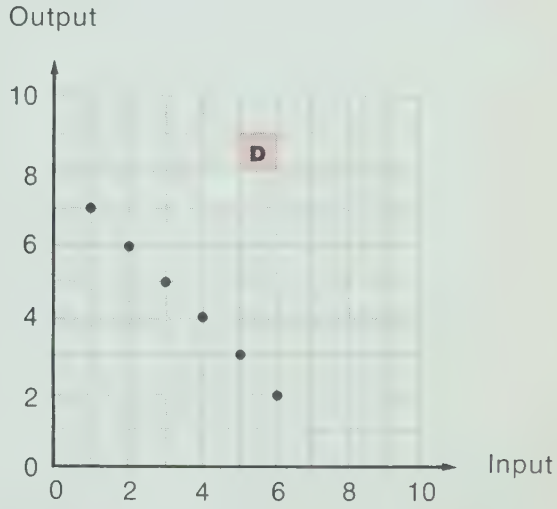
Finding Function Rules

Complete an input-output card for each point on the graph.
Then give a function rule for the set of cards.









Cards for **A**

Function Rule

Input	Output
0	1
1	3

Cards for **B**

Function Rule

Input	Output

Cards for **C**

Function Rule

Input	Output
1	9
2	

Cards for **D**

Function Rule

Input	Output

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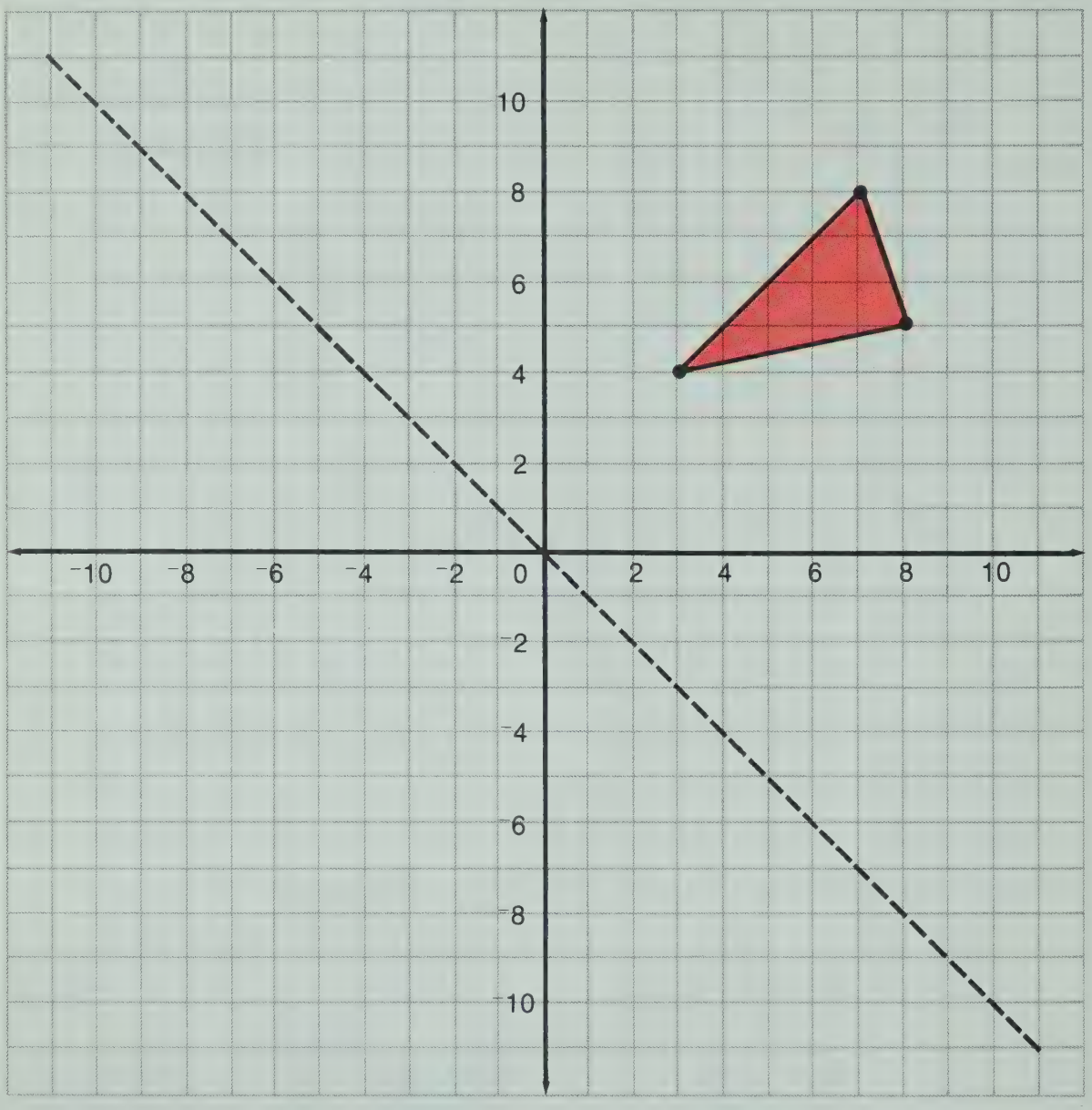
Positive and Negative Coordinates

Imagine the red triangle is covered with wet paint. If you folded the paper it would leave a mark on the other side of the fold.



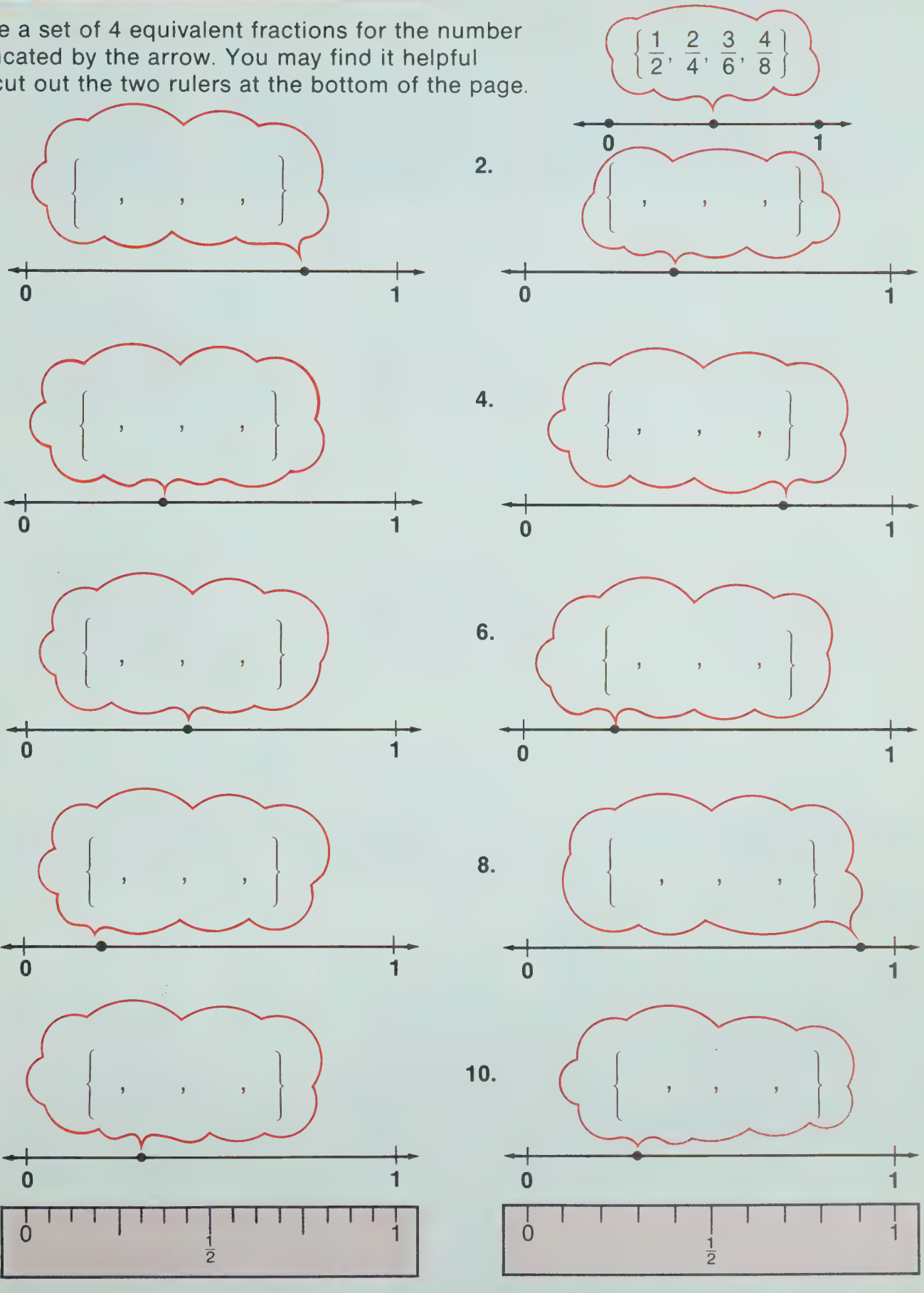
1. Show the mark the red triangle will leave when you fold the paper along the given lines. Give the coordinates of the vertices of each triangle.

A The horizontal number line. _____

B The vertical number line. _____

C The dashed line. _____

Give a set of 4 equivalent fractions for the number indicated by the arrow. You may find it helpful to cut out the two rulers at the bottom of the page.



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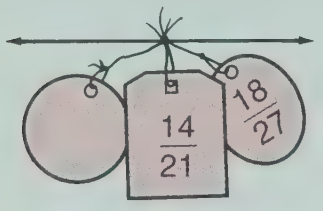
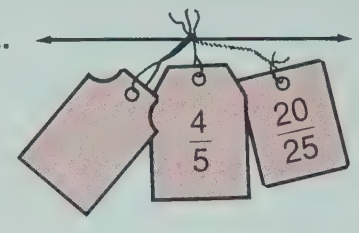
Fractional Number Names

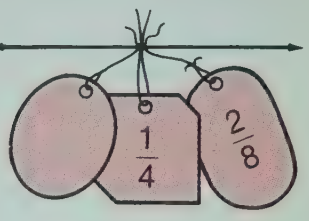
Complete each blank name tag according to directions.

1. 

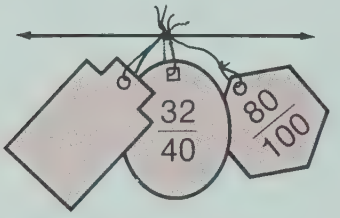
lowest terms

2. 

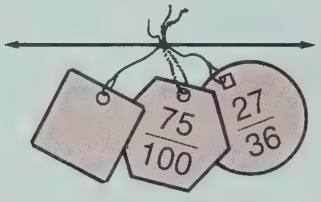
tenths

3. 

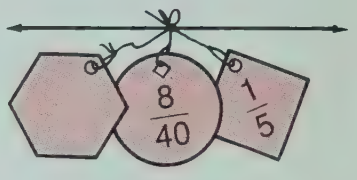
hundredths

4. 

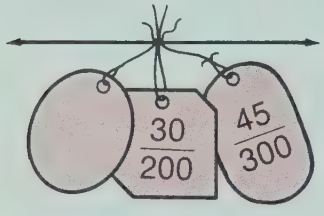
tenths

5. 

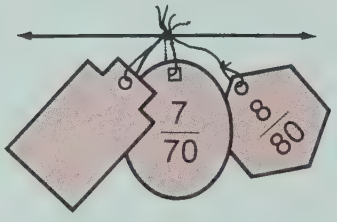
lowest terms

6. 

tenths

7. 

hundredths

8. 

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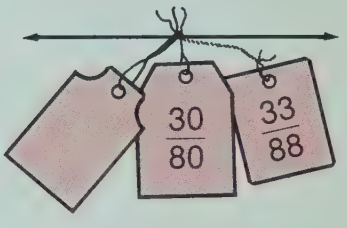
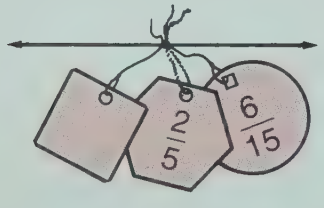
9. 

lowest terms

10. 

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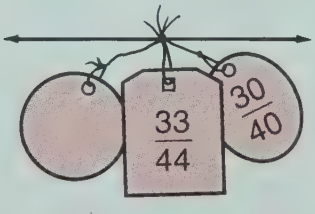
11. 

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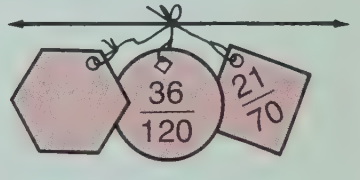
12. 

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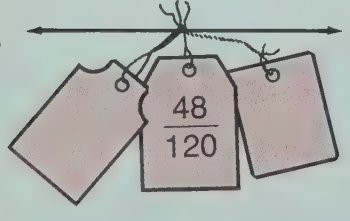
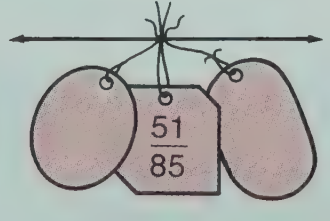
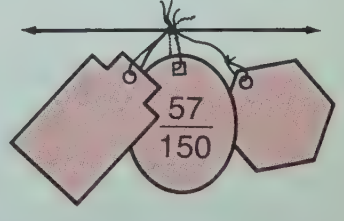
13. 

lowest terms tenths

14. 

tenths hundredths

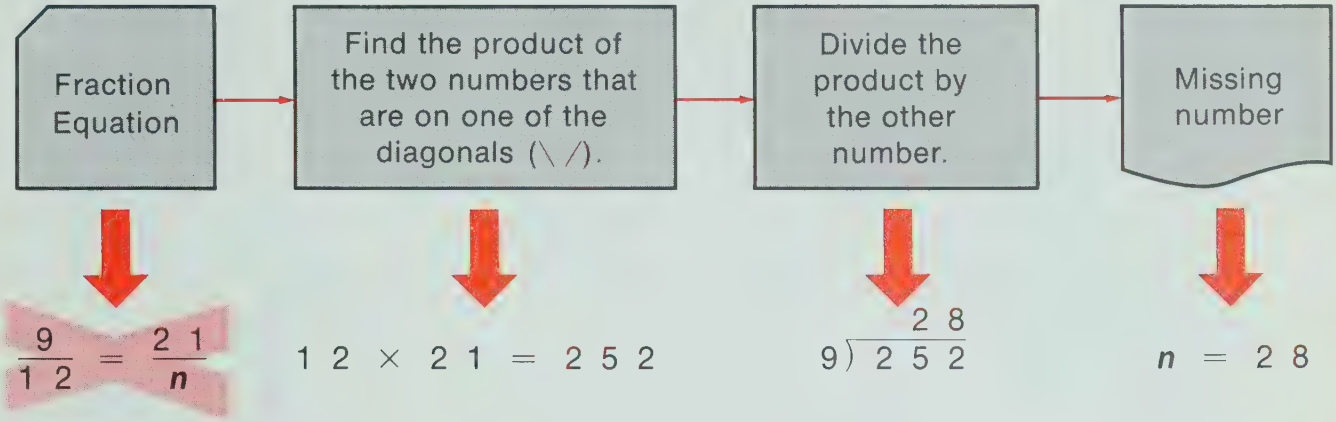
15. 

hundredths lowest terms

Solving Equivalent Fraction Equations

1. Study the flow chart for solving equivalent fraction equations.

A



B Now you finish this one.

$\frac{6}{9} = \frac{n}{45}$ $\quad 6 \times 45 = 270$ $\quad 9\overline{)270}$ $\quad n =$ ____

C Now try this one on your own.

$\frac{9}{15} = \frac{24}{n}$ $\quad 15 \times 24 =$ _____ $\quad \overline{)}$ $\quad n =$ _____

2. Solve the equivalent fraction equations. The answers are somewhere in the answer box.

A $\frac{6}{16} = \frac{12}{n}$

B $\frac{14}{21} = \frac{n}{9}$

C $\frac{n}{25} = \frac{8}{10}$

D $\frac{5}{n} = \frac{45}{54}$

E $\frac{6}{20} = \frac{n}{90}$

F $\frac{5}{12} = \frac{35}{n}$

G $\frac{6}{24} = \frac{11}{n}$

H $\frac{14}{16} = \frac{28}{n}$

I $\frac{n}{30} = \frac{12}{36}$

J $\frac{21}{n} = \frac{27}{36}$

ANSWER BOX

32	44	20
	27	10
84	28	6

ANSWER BOX ANSWER BOX ANSWER BOX

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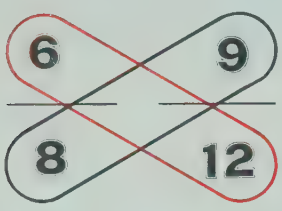
Which Number is Greater?

Study the three examples for 2 fractional numbers.

EXAMPLE 1

When the cross products are the same,

$$\frac{6}{8} \quad \frac{9}{12}$$



$$72 = 72$$

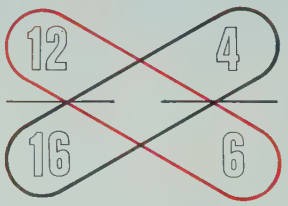
the fractions are equivalent and we write

$$\frac{6}{8} = \frac{9}{12}$$

EXAMPLE 2

When the "red product" is greater,

$$\frac{12}{16} \quad \frac{4}{6}$$



$$72 > 64$$

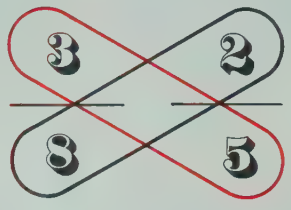
the first number is greater and we write

$$\frac{12}{16} > \frac{4}{6}$$

EXAMPLE 3

When the "black product" is greater,

$$\frac{3}{8} \quad \frac{2}{5}$$



$$15 < 16$$

the second number is greater and we write

$$\frac{3}{8} < \frac{2}{5}$$

1. Put =, >, or < in each ◍

A $\frac{1}{2}$ ◍ $\frac{3}{8}$ **B** $\frac{1}{2}$ ◍ $\frac{4}{7}$ **C** $\frac{2}{3}$ ◍ $\frac{3}{4}$ **D** $\frac{5}{6}$ ◍ $\frac{3}{4}$ **E** $\frac{5}{6}$ ◍ $\frac{5}{8}$

F $\frac{7}{8}$ ◍ $\frac{8}{10}$ **G** $\frac{10}{12}$ ◍ $\frac{15}{18}$ **H** $\frac{6}{7}$ ◍ $\frac{9}{10}$ **I** $\frac{5}{8}$ ◍ $\frac{3}{4}$ **J** $\frac{1}{8}$ ◍ $\frac{1}{7}$

K $\frac{2}{8}$ ◍ $\frac{1}{7}$ **L** $\frac{2}{8}$ ◍ $\frac{2}{7}$ **M** $\frac{1}{4}$ ◍ $\frac{1}{3}$ **N** $\frac{2}{4}$ ◍ $\frac{1}{3}$ **O** $\frac{2}{4}$ ◍ $\frac{2}{3}$

Answers are given below in terms of which number (if either) is greater.

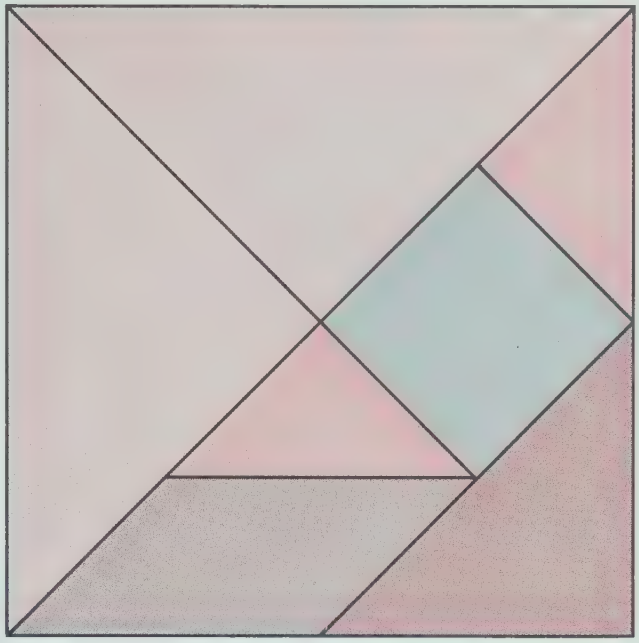
A first	**B** second	**C** second	**D** first	**E** first
F first	**G** equivalent	**H** second	**I** second	**J** second
K first	**L** second	**M** second	**N** first	**O** second

2. Can you arrange these numbers in order from smallest to largest?

$$\frac{1}{2}, \frac{1}{4}, \frac{2}{5}, \frac{3}{8}, \frac{2}{3}, \frac{5}{6}, \frac{7}{8}, \frac{1}{3}, \frac{4}{7}.$$

Fractional Numbers and Area

Trace this figure and cut out the seven **tangram** pieces.



Use the small squares on the grid as units. Place your tangram pieces on the grid to help you answer these questions.

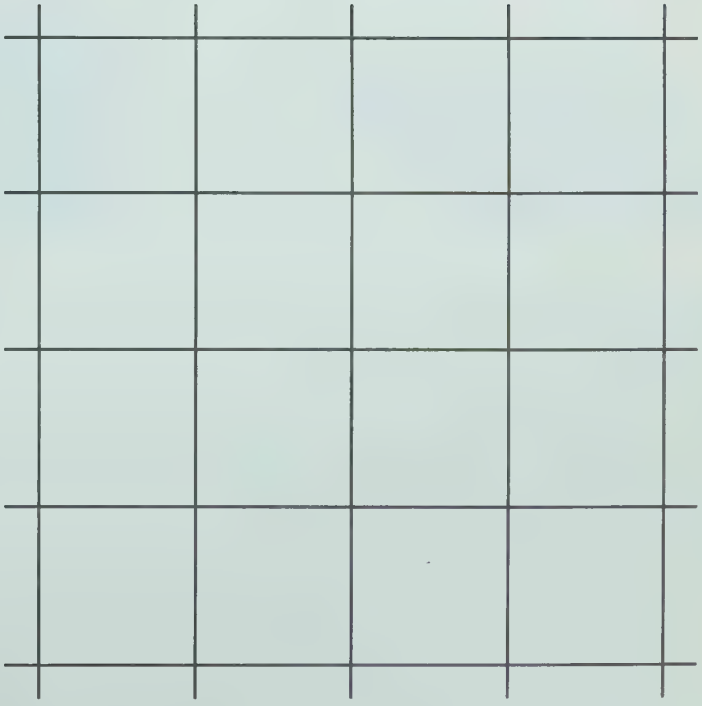
1. The area of each large triangle is _____.

2. The area of each small triangle is _____.

3. The area of the other triangle is _____.

4. The area of the square is _____.

5. The area of the parallelogram is _____.



If your answers are correct, the sum of the numbers in the 5 questions should be 11. Save your tangram pieces for page 94.

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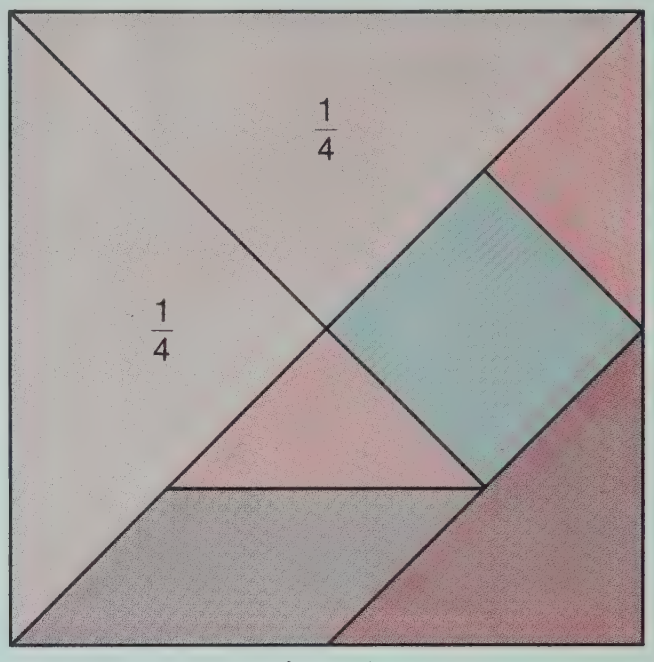
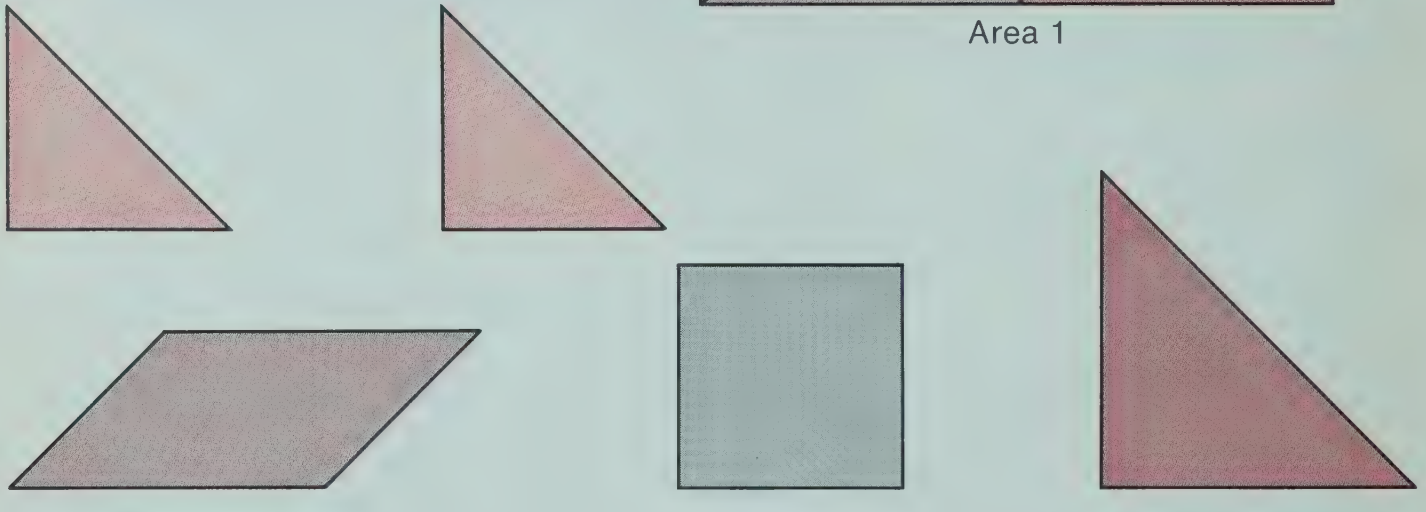
Adding Fractional Numbers

Suppose the area of the large tangram square is 1. Do you see that the area of each large triangle is $\frac{1}{4}$?

Can you find the area of each of the other tangram pieces? Write your answer on the tangram pieces pictured below. Your tangram pieces from the last lesson should help you.

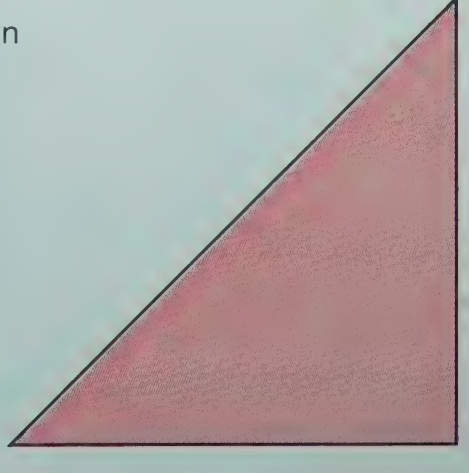


Area 1



1. Can you place your two small tangram pieces so they just "fit" on top of the
   A parallelogram? B square? C middle-sized triangle?

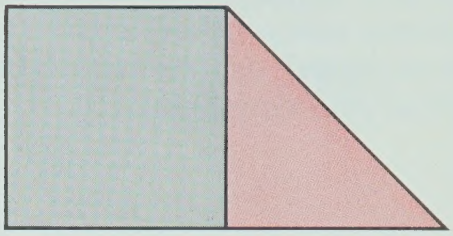
2. Can you find 3 small pieces that will just fit on one of the large triangles?
   Show how you did it on this triangle.



More About Addition

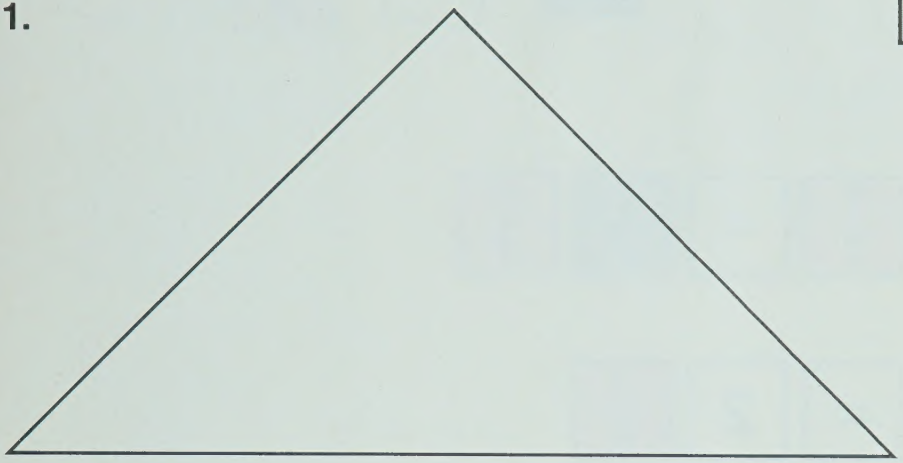
Write the fractional area that you found in the last lesson on each of your tangram pieces. Find the area of each figure by placing tangram pieces over them. Write an equation to show how you did it. Write the area inside the figure.

EXAMPLE



$$\frac{1}{8} + \frac{1}{16} = \frac{3}{16}$$

1.



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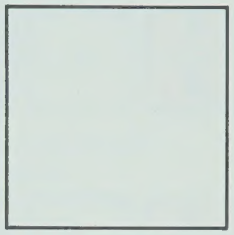
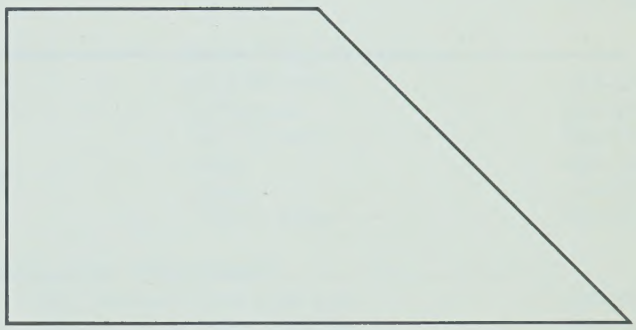


3.

4.



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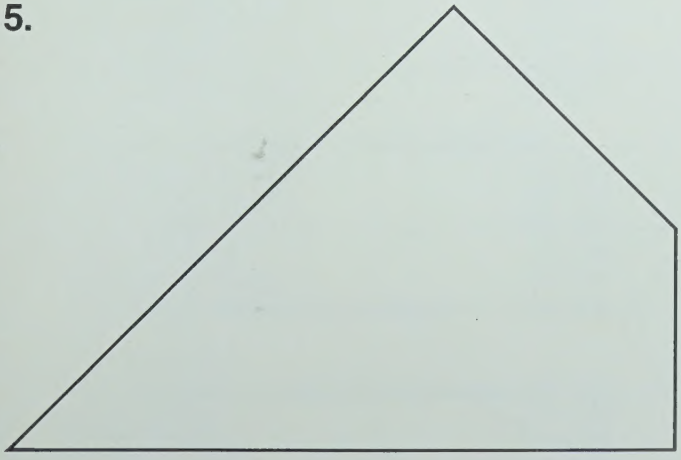
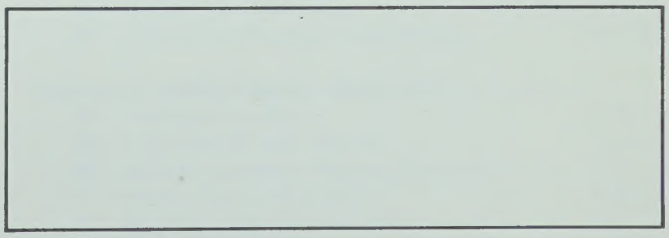


6.

7.



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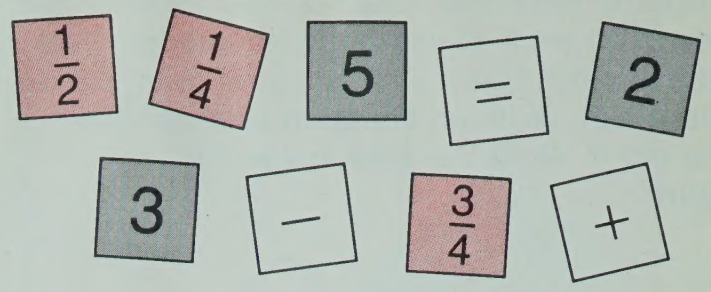
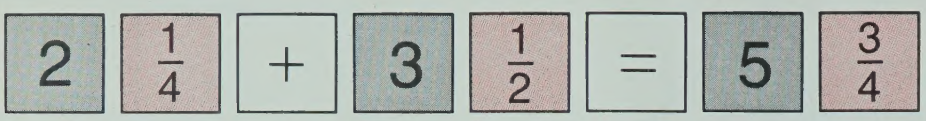
Writing Fractional Nu

Make slips of paper with these numerals and signs on them. How many different equations can you "write" with your slips of paper? Use the record below to show your equations.



EXAMPLES:



Record

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